

# **The Endangered Species Act: What We Talk about When We Talk about Recovery**

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*The objective of the Endangered Species Act is to recover species that are at risk of extinction. The drafters of the Act shared a widely held assumption that recovery would follow from an orderly progression: species at risk of extinction would be identified, the factors placing them at risk would be determined, the methods needed to eliminate the threats would be determined and implemented, and the species would be recovered to a point at which they could be delisted as a self-sustaining wild population that would need only the protection of already existing regulatory mechanisms. The reality has proved far more complex.*

*Abstractly, recovery requires an assessment of the risk (the probability of extinction over some period of time) facing the species and an ethical / policy judgment that that risk is acceptable. The federal wildlife agencies have only recently begun to address these factors explicitly. As a result, the best information of what "recovery" means are the decisions delisting species as recovered. These decisions demonstrate that the agencies have focused on two distinguishable factors. The first is a demographic component that is met when a species has sufficient numbers and is sufficiently dispersed to reduce the risk from stochastic events to a reasonable level. The second factor focuses on risk management: are there sufficient conservation-management mechanisms to provide reasonable assurances that the removal of the ESA's protection will not jeopardize the species? Under both factors, the agency implicitly evaluates the acceptability of the risk under the reasonableness rubric.*

*This article evaluates five cases against the agencies's operational definition.*

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Writing is seldom an entirely solitary endeavor -- this article perhaps less so than many. The genesis of the idea for conservation-reliant species and recovery-management agreements grew out of Endangered Species Act @ 30 Project, a multi-disciplinary, multi-interest evaluation of the Act that J. Michael Scott (University of Idaho, College of Natural Resources and U.S. Geological Survey) and I began in the winter of 2001. Frank Davis (University of California-Santa Barbara, Bren School of Environmental Science and Management) and Geoffrey Heal (Columbia University, Graduate School of Business) joined as organizers the following spring and fall. For additional information on the Endangered Species Act @ 30 Project, see Dale D. Goble et al., *Preface*, in *THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE* xi-xiv (Dale D. Goble et al. eds. 2005). See also J. Michael Scott et al., *Recovery of Imperiled Species under the Endangered Species Act: The Need for a New Approach*, 3 *FRONTIERS IN ECOLOGY & ENV'T* 383 (2005). In addition, several people have assisted this iteration -- whether through discussions on the issues or by providing documents; thanks to Mike Scott, Erik Ryberg, Holly Doremus, Barbara Cosens, John Fay, Susan Kilgore, Maureen Laffin, Michael Nelson, and Kieran Suckling. The usual disclaimers apply with particular force.

Recovery is an elusive concept.

Under the Endangered Species Act,<sup>1</sup> the terms that define the concept are inevitably imprecise and ambiguous. This linguistic ambiguity is compounded by the unavoidable uncertainty of the science underpinning the decisionmaking. The combination of linguistic and scientific uncertainty haunts both the fundamental ethical/policy choice and the daunting risk-management issues presented by the Act's mandate that the nation recover species at risk of extinction.

The drafters of the ESA specified that its purpose is the "conservation" of at-risk species and the ecosystems upon which these species depend.<sup>2</sup> This is an aggressive objective because the term "conservation" and its cognates are defined as the affirmative duty to "use ... all methods and procedures which are necessary to bring any [listed] species to the point at which the measures provided pursuant to this Act are no longer necessary."<sup>3</sup> Successful conservation thus is recovery -- an equivalence that the agencies responsible for implementing the Act (the Fish and Wildlife Service (USFWS) in the Department of the Interior and the National Oceanic and Atmospheric Administration-Fisheries (NOAA) in the Department of Commerce<sup>4</sup>) first made explicit in

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<sup>1</sup> 16 U.S.C. • 1533-1544 (2000).

<sup>2</sup>The purposes of this Act are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, [and] to provide a program for the conservation of such endangered species and threatened species.  
*Id.* • 1531(b). *Cf. id.* • 1536(a)(1) ("All federal agencies shall ... utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of [listed] species.").

<sup>3</sup> *Id.* • 1532(3). In 1988, Congress linked recovery to conservation in requiring Secretary to "implement a system ... to monitor ... the status of all species which have recovered to the point at which the measures provided pursuant to this Act are no longer necessary" and which have therefore been delisted. Endangered Species Amendments of 1988, Pub. L. No. 100-478, • 1004, 102 Stat. 2306, 2307 (1988) (currently codified at 16 U.S.C. • 1533(g)).

<sup>4</sup> As with most federal statutes, the ESA delegates power to a cabinet-level officer, in this case generally either the Secretary of the Interior or the Secretary of Commerce. 16 U.S.C. • 1532(15). The Secretary of the Interior has delegated his statutory authority to the USFWS; the Secretary of Commerce has delegated his authority the NOAA (formerly the Marine Fisheries Service (NMFS)). Note that NOAA is authorized to list a species and to reclassify a species from threatened to endangered, but is only authorized to "recommend" delisting a species or

1980.<sup>5</sup>

The drafters of the statute envisioned an orderly progression. The process of recovery begins with a *risk assessment*. If the responsible federal wildlife agency (either USFWS or NOAA) determines that the species is sufficiently at risk of extinction, it is listed as either "endangered"<sup>6</sup> or "threatened."<sup>7</sup> Once a species is listed, the Act's second type of actions -- *risk-management* -- come into play. These provisions fall into two general groups. The first are focused on preventing extinction: these actions protect the listed species from activities that threaten its continued existence.<sup>8</sup> The second

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reclassifying a species from endangered to threatened. 16 U.S.C. • 1533(a)(2).

<sup>5</sup> Rules for Listing Endangered and Threatened Species, Designating Critical Habitat, and Maintaining the Lists, 45 Fed. Reg. 13,010, 13,023 (1980) (codified at 50 C.F.R. • 424.11(d)(2)) (a species can be delisted as recovered when "the evidence shows that it is no longer Endangered or Threatened"). The term was formally defined in joint USFWS and NOAA regulations in 1986 to mean the "improvement in the status of listed species to the point at which the listing is no longer appropriate under the criteria set out in section 4(a)(1) of the Act." Interagency Cooperation -- Endangered Species Act of 1973, as Amended; Final Rule, 51 Fed. Reg. 19,926, 19,958 (1986) (currently codified at 50 C.F.R. • 402.02). In 1990, the USFWS issued guidelines on recovery planning that amplified the then-existing regulatory definition:

Recovery is the process by which the decline of an endangered or threatened species is arrested or reversed, and threats to its survival are neutralized, so that its long-term survival in nature can be ensured. The goal of this process is the maintenance of secure, self-sustaining wild populations of species.

Fish & Wildlife Service, Policy and Guidelines for Planning and Coordinating Recovery of Endangered and Threatened Species 1 (May 25, 1990). NOAA's new, interim guidance on recovery planning includes a similar statement. See National Marine Fisheries Service, Interim Endangered and Threatened Species Recovery Planning Guidance 1.1-1 (July 2006).

<sup>6</sup> "The term 'endangered species' means any species which is in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. • 1532(6).

<sup>7</sup> "The term 'threatened species' means any species which is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." *Id.* • 1532(20).

- <sup>8</sup> The Act's primary extinction-prevention provisions include:
1. the consultation mandate of • 7(a)(2) which requires federal agencies that propose an action (including funding or permitting private action) to consult with the federal wildlife agency to "insure that [the] action ... is not likely to jeopardize the continued existence" of the species or "result in the destruction or adverse modification" of the species' critical habitat. *Id.* • 1536(a)(2). See *generally* Thomas v. Peterson, 753 F.2d 754 (9th Cir. 1985); see also Sierra Club v. U.S. Fish & Wildlife Service, 245 F.3d 434 (5th Cir. 2001); Defenders of Wildlife v. Babbitt, 130 F. Supp. 2d 121 (D.D.C. 2001).
  2. the civil and criminal sanctions imposed by sections 9 and 11 on any person (broadly defined to include governmental and business entities, 16 U.S.C. • 1532(13)) who takes (broadly defined to include harassing or harming, *id.* • 1532(19)) or engages in commerce in endangered species. *Id.* • 1539(a)(1). Threatened species are protected by regulations adopted under • 4(d). See *id.* • 1539(a)(1)(G), 1533(d). The USFWS regulations on threatened species specify that, in the absence of a special rule applicable to an individual species, all of the prohibitions applicable to endangered species are also applicable to threatened species. 50 C.F.R. • 1731(a) (2005). Section 11 contains civil and criminal penalties applicable to violations of the

group of actions are recovery actions: the federal wildlife agency prepares a recovery plan for the species specifying how the threats to its continued existence will be eliminated; the threats are eliminated, and the species recovers.<sup>9</sup> Once there is "substantial" evidence that the species status has changed,<sup>10</sup> the listing agency again assesses the extinction risk facing the species, applying the same substantive standards and the same procedural requirements as those used in the decision to list the species.<sup>11</sup> After delisting, the Act's drafters assumed that the species would thrive

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prohibitions. 16 U.S.C. • 1540. *See generally* United States v. McKittrick, 142 F.3d 1170 (9th Cir. 1998); Christy v. Hodel, 857 F.2d 1324 (9th Cir. 1988), *cert. denied sub nom.*, Christy v. Lujan, 490 U.S. 1114 (1989).

3. the habitat conservation planning requirements for obtaining an incidental take permit in • 10(a)(1)(B). These permits operate as a limit on the take prohibition by permitting take that is "incidental to, and not the purpose of, the carrying out of an otherwise lawful activity." 16 U.S.C. • 1539(a)(1)(B). Before issuing a permit, the wildlife agency must find that the permitted actions "will not appreciably reduce the likelihood of the survival and *recovery* of the species in the wild." *Id.* • 1539(a)(2)(B)(iv) (emphasis added). Similarly, the incidental take statement provision in • 7(b)(4) requires compliance with the standards in • 7(a)(2). *Id.* • 1536(b)(4)(B). *See generally* National Wildlife Federation v. Babbitt, 128 F. Supp. 2d 1274 (E.D. Cal. 2000).

<sup>9</sup> Recovery planning is required by • 4(f). 16 U.S.C. • 1533(f). *See generally* Defenders of Wildlife v. Babbitt, 130 F. Supp. 2d 121 (D.D.C. 2001); Federico Cheever, *The Road to Recovery: A New Way of Thinking about the Endangered Species Act*, 23 ECOLOGY L.Q. 1 (1996). Recovery actions also include:

1. all federal agencies have an (under-enforced) affirmative obligation under • 7(a)(1) to "utilize their authorities in furtherance of the purposes of this Act by carrying out programs for the conservation of [listed] species." 16 U.S.C. • 1536(a)(1). *See generally* Pyramid Lake Paiute Tribe of Indians v. U.S. Department of Navy, 898 F.2d 1210 (9th Cir. 1990); House v. U.S. Forest Service, 974 F. Supp. 1022 (E.D. Ky. 1997); J.B. Ruhl, *Section 7(a)(1) of the "New" Endangered Species Act: Rediscovering and Redefining the Untapped Power of Federal Agencies Duty to Conserve*, 25 ENVTL. L. 1107 (1995).
2. under • 10(a), the wildlife agencies are authorized to issue recovery permits "to enhance the ... survival of the affected species." 16 U.S.C. • 1539(a)(1)(A).
3. under • 10(j), the wildlife agencies are authorized to introduce experimental populations of listed species. *Id.* • 1539(j). *See generally* Wyoming Farm Bureau Federation v. Babbitt, 199 F.3d 1224 (10th Cir. 2000); Dale D. Goble, *Experimental Populations: Reintroducing the Missing Parts*, in *THE ENDANGERED SPECIES ACT* 379 (Donald C. Baur & Wm. Robert Irvin eds., 2002).
4. finally, Fred Cheever has made a convincing case -- one that appears to be supported by what little empirical data exists -- that the designation of critical habitat is a recovery action. The term is defined as "(i) the specific areas within the geographical area occupied by the species, at the time it is listed ... on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and (ii) specific areas outside the geographical area occupied by the species at the time it is listed ... upon a determination by the Secretary that such areas are essential for the conservation of the species." 16 U.S.C. • 1532(5). *See* Cheever, *supra* at 56-58; *see also* Kieran Suckling & Martin Taylor, *Critical Habitat and Recovery*, in *THE ENDANGERED SPECIES ACT AT THIRTY: RENEWING THE CONSERVATION PROMISE* 75 (Dale D. Goble et al. eds. 2006).

<sup>10</sup> 16 U.S.C. • 1533(b)(3)(B).

<sup>11</sup> The Act mandates an elaborate process for listing a species that includes a petition procedure, evidentiary findings, public notice, and opportunities for comment in addition to statutory deadlines for the various steps. Critical

because the threats to its existence had been eliminated.

Implementing the Act has proved far more complex -- in part because of the impact of the Act itself on our understanding of species conservation<sup>12</sup> and in part because of the compounding impacts of the drivers of extinction.<sup>13</sup>

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habitat is also to be designated at the time of listing. See generally 16 U.S.C. • 1533(a)-(c); U.S. FISH & WILDLIFE SERVICE, DEPARTMENT OF THE INTERIOR, ENDANGERED SPECIES LISTING HANDBOOK (4th ed. 1994).

<sup>12</sup> In defining "conserve," the drafters of the Act conceived the statute to be an ambitious project in planned obsolescence: its goal, after all, is to bring at-risk species to the point "at which the measures provided pursuant to this Act are no longer necessary." 16 U.S.C. • 1532(3). Instead, the ESA has turned out to be a technology-forcing statute: the Act created powerful incentives that have helped to transform fundamentally our understanding of ecosystems -- a process that has have revealed the Act's naivete.

In 1973, ecosystems were conceived as static, equilibria systems: remove the disturbing cause and the system would return to a steady state. The ESA reflects this perspective; it is built upon the assumption that the threats at-risk species face are remediable in the sense that they can be eliminated. The list of threats that the agency is to consider in determining the status of a species, *id.* • 1533(a)(1)(A)-(E), for example, embodies the equilibrium assumption: remove the disturbance -- establish reserves, prohibit take, remove predators, etc. -- and the species will recover. Beyond the possible need for ongoing law enforcement, the Act's measures will no longer be necessary.

Ecologists, however, have increasingly recognized that ecosystems are not equilibria systems, but rather are "complex systems that are dynamic and unpredictable across space and time." Tabatha J. Wallington et al., *Implications of Current Ecological Thinking for Biodiversity Conservation: A Review of the Salient Issues*, 10(1) *ECOLOGY & Soc'y* 15, 15 (2005) (visited Sept. 15, 2005) <<http://www.ecologyandsociety.org/vol10/iss1/art15>>. In Daniel Botkin's metaphor, nature is a discordant harmony: "We see a landscape that is always in flux, changing over many scales of time and space, changing with individual births and deaths, local disruptions and recoveries, larger scale responses to climate from one glacial age to another, and to the slower alterations of soils, and yet larger variations between glacial ages." DANIEL B. BOTKIN, *DISCORDANT HARMONIES* 62 (1990). As a result, the state of any ecosystem or population is most accurately described in probability distributions rather than determinate values. "[R]andom [*i.e.*, probabilistic] events play a major role in the life of species and in the functioning of ecosystems." Lawrence L. Master et al., *Vanishing Assets: Conservation Status of U.S. Species*, in *PRECIOUS HERITAGE* 93, 95 (Bruce A. Stein et al. eds., 2000). Ecology is an historical science because both species and ecosystems are historical artifacts that reflect the events that have occurred in and to them.

One result of our shifting understanding is that the Act is designed to address threats that do not reflect the predominant problems facing declining species. Removing a disturbance through take restrictions and refuge creation is insufficient to recover most species because most species have not been put at risk by discrete causes such as over-harvest or the effects of DDT. Instead, most species are imperiled by the incidental effects of habitat degradation and invasive species. One study, for example, found that 60% of the listed species in the United States are imperiled by either disruption of natural fire disturbance regimes or the spread of non-native species. David S. Wilcove & Linus Y. Chen, *Management Costs for Endangered Species*, 12 *CONSERVATION BIOLOGY* 1405 (1998); see also David S. Wilcove et al., *Leading Threats to Biodiversity: What's Imperiling U.S. Species*, in *PRECIOUS HERITAGE* 239 (Bruce A. Stein et al. eds., 2000) [hereinafter cited as Wilcove et al., *Leading Threats*]; David S. Wilcove et al., *Quantifying Threats to Imperiled Species in the United States: Assessing the Relative Importance of Habitat Destruction, Alien Species, Pollution, Overexploitation, and Disease*, 48 *BioSci.* 607 (1998) [hereinafter cited as Wilcove et al., *Quantifying Threats*].

<sup>13</sup> The population of the United States was about 212 million when Richard Nixon signed the ESA in the waning days of 1973 -- nearly 45 percent less than the current more than 303 million. See generally Holly Doremus, *Lessons Learned*, in *THE ENDANGERED SPECIES ACT AT THIRTY*, *supra* note 9, at 195, 195; U.S. Census Bureau, U.S. POPClock Projection (visited Jan. 1, 2008 ■ so the number is greater today) <<http://www.census.gov/population/www/popclockus.html>>. Habitat loss has been even more dramatic: urbanized

## 1. The Coordinates of Recovery: Probability, Time, and Acceptability

The decision that a species has recovered requires an assessment of the risk of extinction the species faces. As first-year torts students soon discover, "risk" is the probability that something bad will happen.<sup>14</sup> Under the ESA, the bad possible event is the extinction of a species. Since extinction is nearly always a process rather than a calamitous event, the risk assessment also includes a temporal scale over which the risk is to be assessed. Thus, the risk of extinction has two components: probability and time.

In principle at least, these two components are determinable -- albeit with greater or lesser certainty. Conservation biologists currently employ population viability analysis (PVA) to provide information on the probability that a species will become extinct within a specified period of time.<sup>15</sup> A PVA is a demographic population model that, like other demographic population models, begins with a mathematical description of the species or population that is built upon data on mortality rates, recruitment rates, and the age distribution of the population. It differs from other demographic models by focusing on extinction and including those stochastic processes believed to significantly impact extinction: demographic stochasticity ("chance events in the survival and reproductive

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land increased 34 percent between 1982 and 1997 alone. Doremus, *supra* at 195. The nation's gross national product (GNP) has increased nearly 10 times, from \$1464 billion to \$14071.6 billion. U.S. Department of Commerce, Gross National Product (visited Jan. 1, 2008) <<http://research.stlouisfed.org/fred2/data/GNP.txt>>. These domestic transformations are compounded by the emerging drivers of global change such as economic globalization and climate change.

<sup>14</sup> See, e.g., *United States v. Carroll Towing Co.*, 159 F.2d 169, 173 (2d Cir. 1947) (Hand, J.).

<sup>15</sup> This description of population viability analysis is based upon Steven R. Beissinger & M. Ian Westphal, *On the Use of Demographic Models of Population Viability in Endangered Species Management*, 62 J. WILDLIFE MANAGEMENT 821 (1998); Mark S. Boyce, *Population Viability Analysis*, 23 ANN. REV. ECOLOGY & SYSTEMATICS 481 (1992); D. DeMaster et al., Recommendations to NOAA Fisheries: ESA listing criteria by the Quantitative Working Group, (June 10, 2004) (Tech. Memo. NMFS-F/SPO-67, National Oceanic & Atmospheric Administration, Seattle); Hugh P. Possingham et al., *Population Viability Analysis*, in *ENCYCLOPEDIA OF BIODIVERSITY* 831, 831 (Simon A. Levin ed., 2001). It is important to note that there is no single PVA model. Rather, the term refers to the approach employed. Beissinger & Westphal, *supra*, at 822-29.

success of a finite number of individuals"), environmental stochasticity ("temporal variation of habitat parameters and the population of competitors, parasites, and diseases"), genetic stochasticity ("changes in gene frequencies due to founder effect, random fixation, or inbreeding"), and natural catastrophes ("floods, fires, droughts, etc., which may occur at random intervals through time").<sup>16</sup> The models allow the relative importance of different threats to be evaluated by varying the data and comparing the output (the probability of extinction of a species or population over a specified period).<sup>17</sup>

For example, in listing the orca population in Puget Sound (the Southern Resident killer whale DPS), NOAA evaluated a PVA that the biological review team had prepared.<sup>18</sup> Noting that, even under the most optimistic iteration of the model, the probabilities of extinction ("less than 0.1 to 3 percent in 100 years and 2 to 42 percent in 300 years") "were low, but not insignificant," the agency concluded that the species was "at risk of extinction" and listed it as endangered.<sup>19</sup>

The most detailed discussion involves the USFWS's recent decision not to list the cerulean warbler.<sup>20</sup> In assessing the extinction risk, the agency concluded that the

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<sup>16</sup> Mark L. Shaffer, *Minimum Population Sizes for Species Conservation*, 31 *BIOSCIENCE* 131, 132 (1981). These four type of risks are examined in more detail in Boyce *supra* note 15, at 483-95; COMMITTEE ON SCIENTIFIC ISSUES IN THE ENDANGERED SPECIES ACT, NATIONAL RESEARCH COUNCIL, *SCIENCE AND THE ENDANGERED SPECIES ACT* 124-43 (1995) [hereinafter cited as COMMITTEE ON SCIENTIFIC ISSUES]; Possingham, *supra* note 15, at 832-35.

<sup>17</sup> In the seminal paper, Shaffer calculated the risk of extinction of Yellowstone population of grizzly bears. Shaffer, *supra* note 16, at 133. For a more complete example, see David B. Lindenmayer & Hugh P. Possingham, *Ranking Conservation and Timber Management Options for Leadbetter's Possum in Southeastern Australia Using Population Viability Analysis*, 10 *CONSERVATION BIOLOGY* 235 (1996).

<sup>18</sup> See Endangered and Threatened Species; Endangered Status Southern Resident Killer Whales, 70 Fed. Reg. 69,903, 69,909 (2005).

<sup>19</sup> 70 Fed. Reg. at 69,909. In contrast, in a decision not to list slickspot peppergrass, the USFWS argued that a 64-82% chance of extinction within 100 years was not a "foreseeable" event; this assertion that prompted the federal district court to respond -- understandably -- that the agency's decision "defies common sense." *Western Watersheds Project v. Foss*, 2005 WL 2002473, at 9, 11 (D. Idaho Aug. 19, 2005). In the *Federal Register* notice withdrawing the proposed rule to list the species (the decision prompting the judicial decision), the agency had not reported the numerical estimates, preferring to focus on the species' improved chance of survival (to 36%) with proposed conservation measures. Endangered and Threatened Wildlife and Plants; Withdrawal of Proposed Rule to List *Lepidium papilliferum* (Slickspot peppergrass) as Endangered, 69 Fed. Reg. 3094, 3100 (2004). The approach brings to mind the old joke about lies, damn lies, and statistics.

<sup>20</sup> Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Cerulean

best available science indicated that (1) the estimated total population of the species was 390,000 individuals in 2006 (plus or minus 50 percent, *i.e.*, between 535,000 and 145,000) and (2) the population trend of the species was an annual decline of 3.2 percent (between 4.2 and 2.0 percent with a 90 percent certainty).<sup>21</sup> This suggested that the population would decline to 200,000 in 20 years, 80,000 in 50 years, and 15,000 in 100 years. But, as the agency noted,

the farther into the future we attempt to predict, the less confident we can be that the historical trend will persist. Future population sizes will vary due to a variety of factors, both random events and progressive changes in causal environmental factors that we cannot foresee at this time.<sup>22</sup>

The agency therefore concluded that the species was not at risk of extinction in the foreseeable future.<sup>23</sup>

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Warbler (*Dendroica cerulea*) as Threatened with Critical Habitat, 71 Fed. Reg. 70,717, 70,718 (2006).

<sup>21</sup> *Id.* at 70,731, 70,723.

<sup>22</sup> *Id.* at 70,731.

<sup>23</sup> *Id.* at 70,731-32. Decisions specifying what is the foreseeable future (the term that directly implicates the time element of risk) appear similarly ad hoc. At one extreme is the recent delisting of the Greater Yellowstone DPS of grizzly bears, in which the USFWS adopted the definition from *Merriam-Webster's Dictionary of Law* of "foreseeable future" as "such as reasonably can or should be anticipated: Such that a person would expect it to occur or exist under the circumstances." This definition was chosen, "as opposed to an a priori time period (e.g., 100 years), to avoid placing an arbitrary limit on our time horizon." Endangered and Threatened Wildlife and Plants; Final Rule Designating the Greater Yellowstone Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears from the Federal List of Endangered and Threatened Wildlife; 90-Day Finding on Petition to List as Endangered the Yellowstone Distinct Population Segment of Grizzly Bears, 72 Fed. Reg. 14,866, 14,910 (2007). It does seem at least strange, however, to adopt such an fundamentally ambiguous standard to make what is supposed to be a scientific decision. See 16 U.S.C. § 1533(b)(1)(A)). In contrast, in the proposal to delist the Greater Yellowstone DPS the agency adopted "approximately 100 years" "based on 10 grizzly bear generations where a single female may take 10 years to replace herself in a population." Endangered and Threatened Wildlife and Plants; Designating the Greater Yellowstone Population of Grizzly Bears as a Distinct Population Segment; Removing the Yellowstone Distinct Population Segment of Grizzly Bears from the Federal List of Endangered and Threatened Wildlife; Proposed Rule, 70 Fed. Reg. 69,853, 69,866 (2005). The agency noted that "[t]his time period is also commonly used in population viability analyses of grizzly bear populations." *Id.* Although the numbers have varied, the common approach has been to employ a numerical standard often based on the species's generation time. *E.g.*, Endangered and Threatened Wildlife and Plants; 12-Month Petition Finding and Proposed Rule to List the Polar Bear (*Ursus maritimus*) as Threatened Throughout Its Range, 72 Fed. Reg. 1064, 1070-71 (2007) (foreseeable future is 45 years based on the International Union for the Conservation of Nature and Natural Resources (IUCN) Red List process which uses "10 years or three generations, whichever is the longer"); Endangered and Threatened Species; Final Listing Determinations for Elkhorn Coral and Staghorn Coral, 71 Fed. Reg. 26,852, 26,856-57 (2006) (30 years in assessing the risk to elkhorn coral and staghorn



The limitations of PVAs reflect the fundamental uncertainty of the underlying science: extinction is a complex, poorly understood *probabilistic* process. Its probabilistic nature means that it is an indeterminate process even if we had complete knowledge of all of the factors that affect the process -- and our knowledge is far from complete.<sup>24</sup> Thus, the risk of extinction that any species faces is uncertain to a greater or lesser degree. Acknowledging this inherent uncertainty is not an argument for rejecting PVAs out of hand -- they are, after all, part of "the best scientific ... data

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coral: "we established that the appropriate period of time corresponding to the foreseeable future is a function of threats, life-history characteristics, and the specific habitat requirements for the species"); Endangered and Threatened Wildlife and Plants; 12-Month Finding for a Petition to List the Yellowstone Cutthroat Trout as Threatened, 71 Fed. Reg. 8818, 8830 (2006) (20 to 30 years, which is 4 to 10 generations "depending on the productivity of the environment" -- a period which "is long enough to take into account multi-generational dynamics of life-history and ecological adaptation, yet short enough to incorporate social and political change that affects species management"); Endangered and Threatened Wildlife and Plants; Designating the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment; Removing the Northern Rocky Mountain Distinct Population Segment of Gray Wolf from the Federal List of Endangered and Threatened Wildlife, 71 Fed. Reg. 6634, 6643 (2006) (30 years -- 10 generations -- because "[i]t has taken 30 years for the causes of wolf endangerment to be alleviated and for ... wolf populations to recover") [hereinafter cited as NRM Wolf Proposed Delisting]; Endangered and Threatened Wildlife and Plants; 12-Month Finding for Petitions to List the Greater Sage-Grouse as Threatened or Endangered, 70 Fed. Reg. 2244, 2281 (2005) ("30 to 100 years, about 10 greater sage-grouse generations to 2 sagebrush habitat cycles"); Endangered and Threatened Wildlife and Plants; Reconsidered Finding for an Amended Petition to List the Westslope Cutthroat Trout as Threatened Throughout Its Range, 68 Fed. Reg. 46,989, 47,006 (2003) (20 to 30 years, "approximately 4 to 10 WCT generations").

<sup>24</sup> Possingham et al., *supra* note 15, at 831; see generally Brian Dennis et al., *Estimation of Growth and Extinction Parameters for Endangered Species*, 61 ECOLOGICAL MONOGRAPHS 115, 115-16 (1991); Kathlee LoGiudice, *Toward a Synthetic View of Extinction: A History Lesson from a North American Rodent*, 56 BIOSCI. 687 (2006). For example, it remains uncertain why the passenger pigeon, once the most common terrestrial animal, became extinct. One theory is that the population collapsed because the killing focused on the species' colonial nestings where the density of the birds made the work much easier. In addition, there was a substantial market for squabs -- the unfledged nestlings. Hunters could simply shake the trees and picked up the squabs as they fell from the nests. In its dense nesting colonies, it was possible to kill almost every squab. Furthermore, shooting near colonies caused pigeons to abandon their nests and nestlings. The massive killing coupled with the low rate of reproduction (one egg per nesting), led to a failure to recruit new members into the aging population and doomed the species. David E. Blockstein & Harrison B. Tordoff, *A Contemporary Look at the Extinction of the Passenger Pigeon*, 39 AM. BIRDS 845, 850 (1985); Etta S. Wilson, *Personal Recollections of the Passenger Pigeon*, 51 AUK 157, 165-66 (1934). Alternatively, it has been argued that the species required high population densities to breed. Once the population fell below that threshold, most pigeons ceased to breed. I.L. Brisbin, *The Passenger Pigeon: A Study in the Ecology of Extinction*, MODERN GAME BREEDING, Oct. 1968, at 13, 19-20; T.R. Halliday, *The Extinction of the Passenger Pigeon, Ectopistes migratorius, and Its Relevance to Contemporary Conservation*, 17 BIOLOGICAL CONSERVATION 157 (1980); J. Michael Reed, *The Role of Behavior in Recent Avian Extinctions and Endangerment*, 13 CONSERVATION BIOLOGY 232 (1999). Others have suggested that habitat fragmentation and diseases were contributing causes. *E.g.*, Norman Myers, *The Extinction Spasm Impending: Synergisms at Work*, 1 CONSERVATION BIOLOGY 14, (1987); Katherine F. Smith et al., *Evidence for the Role of Infectious Disease in Species Extinctions and Endangerment*, 20 CONSERVATION BIOLOGY 1349 (2006).

available."<sup>25</sup> It is instead simply a recognition of the limitations of data.

Ultimately, however, determining that a species is either endangered or threatened is not a scientific decision.<sup>26</sup> Beyond the question of risk (that is, the probability of extinction over some temporal scale), is the fundamental *ethical/policy* question: What risk is *acceptable*? Although science can inform this judgment (by shedding light on the probability and time elements of the risk), it cannot -- given the gap between the descriptive and the prescriptive -- make the actual decision.

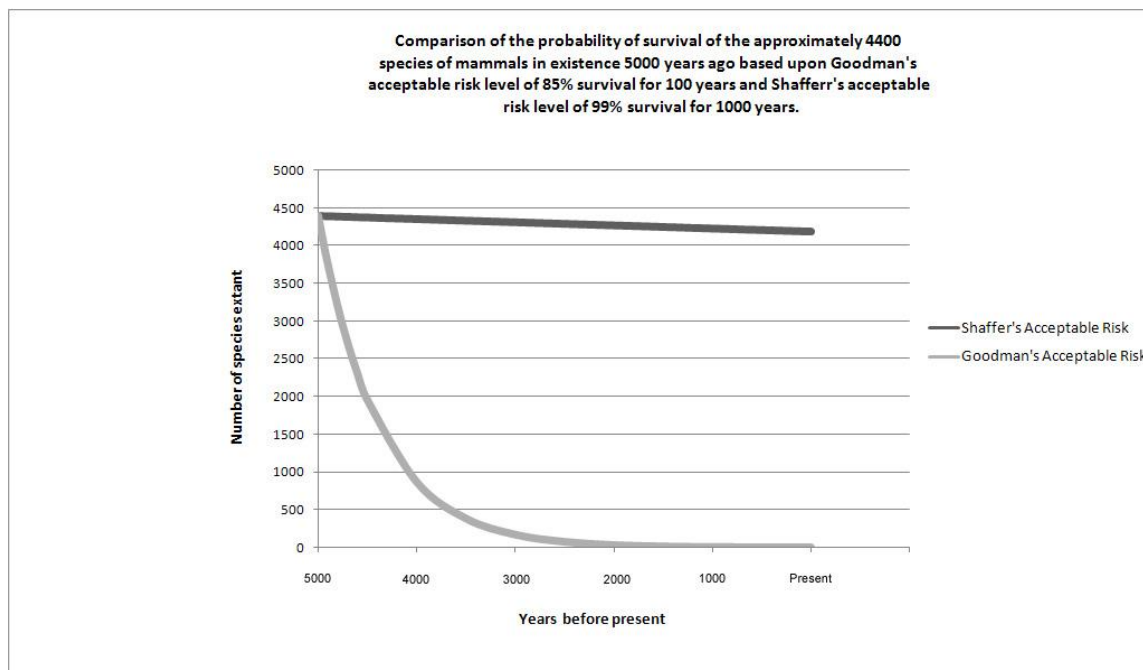
Consider, for example, a thought experiment proposed by Daniel Goodman.<sup>27</sup> (See figure 1.) Assume that 5,000 years ago, our species adopted a global policy of managing the environment to ensure an 85 percent probability that no species of mammal would go extinct within 100 years. The probability of any one of the

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<sup>25</sup> 16 U.S.C. • 1533(b)(1) (emphasis added); see also *id.* • (b)(2) (designation of critical habitat); *id.* • (b)(7) (emergency listing); *id.* • 1536(a)(2) (jeopardy determination); *id.* • (c)(1) (biological assessment); *id.* • (h)(2)(B)(i) (exemption determination); *id.* • 1539(j)(2)(B) (designation of experimental population as nonessential).

<sup>26</sup> Holly Doremus, *Listing Decisions under the Endangered Species Act: Why Better Science Isn't Always Better Policy*, 75 WASH. U.L.Q. 1029, 1088 (1997). See also DeMaster et al., *supra* note 15, at 2-3; Robin S. Waples et al., *A Biological Framework for Evaluating whether a Species Is Threatened or Endangered in a Significant Portion of Its Range*, 21 CONSERVATION BIOLOGY 964, 965 (2007).

<sup>27</sup> Daniel Goodman, *Predictive Bayesian Population Viability Analysis: A Logic for Listing Criteria, Delisting Criteria, and Recovery Plans*, in POPULATION VIABILITY ANALYSIS 447, 454 (Steven R. Beissinger & Dale R. McCullough eds., 2002).



approximately 4400 mammals then in existence surviving to the present would be 0.0003 per species. Assuming that the dynamics of all of the species were independent, the probability is 27 percent that no mammals would remain. The probability that more than 3 species of mammals would remain is only 4 percent. In contrast, consider the approach of Mark Shaffer who "arbitrarily propose[d]" a definition of acceptable risk as "a 99% chance of remaining extant for 1000 years despite the foreseeable effects of demographic, environmental, and genetic stochasticity, and natural catastrophes."<sup>28</sup> Using Shaffer's metric, the probability of any one of the 4400 mammals surviving to the present would be 95 percent per species -- 4184 species of mammals would probably survive. While the results obviously differ dramatically, neither Goodman's nor Shaffer's standard is more "scientific" than the other -- both turn on an ethical/policy decision on what is an *acceptable* risk.

The Act's decisionmaking standard for this risk assessment is its interlocking

<sup>28</sup> Shaffer, *supra* note 16, at 132. Shaffer describes his choices as "arbitrary"; it is, however, more accurate to label them "ethical" or "policy" positions rather than "scientific" statements. See also Boyce, *supra* note 15, at 482 ("Definitions and criteria for viability, persistence, and extinction are arbitrary, e.g., ensuring a 95% probability of surviving for at 100 years.").

definitions of "endangered" -- "in danger of extinction throughout all or a significant portion of its range"<sup>29</sup> -- and "threatened" -- "likely to become ... endangered ... within the foreseeable future throughout all or a significant portion of its range."<sup>30</sup> For recovery, the crucial standard is whether the species is "threatened" since a species that is threatened is less at risk than a species that is endangered -- and a species is no longer threatened when it is no longer "likely to become [in danger of extinction] within the foreseeable future throughout all or a significant portion of its range."<sup>31</sup>

Although this language does provide some guidance on both how much probability (*i.e.*, "in danger" and "likely to become" in danger) over how long a time (*i.e.*, "foreseeable future"), the guidance is far from precise: How much "in danger" must a species be to be "endangered"? Beyond a vague "more," how does that degree of risk differ from the degree of risk that is "likely to become" in danger? Or, is the difference between "endangered" and "threatened" measured solely on a temporal scale? That is, is an endangered species "in danger" *now* while a threatened species is "in danger" *within the foreseeable future*? These questions reflect an intractable difficulty in determining when a species is recovered: the linguistic uncertainty that results from the inherent fuzziness of language.

Fundamentally, the decision that a species has recovered is an ethical/policy decision on the acceptability of risk the species faces. This judgment is haunted by the combination of scientific and linguistic uncertainty.

## **2. Decisionmaking under Uncertainty: Status Reviews**

Despite some movement toward quantifying the uncertainty and time elements of the risk of extinction facing a species, these issues have largely been obscured in

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<sup>29</sup> 16 U.S.C. • 1532(6).

<sup>30</sup> *Id.* • 1532(20).

<sup>31</sup> *Id.* • 1532(20), (6).

implementing the Act by the requirement that the assessment of risk of extinction and the determination of the acceptability of that risk be made through a status determination (*i.e.*, listing, reclassification, and delisting decisions) that focuses the decision on an evaluation of five factors that potentially affect the species:

- "(A) the present or threatened destruction, modification, or curtailment of its habitat or range;
- "(B) overutilization for commercial, recreational, scientific, or educational purposes;
- "(C) disease or predation;
- "(D) the inadequacy of existing regulatory mechanisms; or
- "(E) other natural or manmade factors affecting its continued existence."<sup>32</sup>

The analysis of these five factors is the centerpiece of an increasingly detailed case-by-case risk assessment. The strength of this approach is that it permits an extended examination of the specific threats facing a species given what is known about its life history traits.<sup>33</sup> Indeed, the USFWS (which has the statutory responsibility for most species<sup>34</sup>) has argued that this focus is unavoidable because "the circumstances applying to most species are individualistic enough as to be incapable of precise definition or quantification."<sup>35</sup> As a result, the agency adopted a more qualitative

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<sup>32</sup> 16 U.S.C. • 1533(a)(1). The first three of these factors -- habitat loss, overutilization, and predation or disease -- are the primary extrinsic drivers of extinction; the fourth factor focuses on the existing regulatory mechanisms available to control the three extinction factors; the final factor is a precautionary catch-all. The inclusion of "natural causes" emphasizes the congressional conclusion that at-risk species are to be protected regardless of the source of the immediate risk: the hall of mirrors of causation -- proximate or otherwise -- thus was ruled out of bounds. The fact that a potential *coup de grace* is a "natural" event does not require a parsing of the contribution of human actions. See, e.g., CHRISTOPHER COKINOS, *HOPE IS A THING WITH FEATHERS* 121-93 (2000).

<sup>33</sup> E.g., Katherine Ralls et al., *Developing Criteria for Delisting the Southern Sea Otter under the U.S. Endangered Species Act*, 10 CONSERVATION BIOLOGY 1528 (1996).

<sup>34</sup> In general, the Secretary of the Interior has responsibility for all species other than "commercial fisheries, whales, seals, and sea-lions, and related matters." The Fish & Wildlife Act of 1956, Pub. L. No. 1024, • 3(d)(1), 70 Stat. 1119, 1120. Responsibility for these species was transferred from the now-defunct Bureau of Commercial Fisheries of the Department of the Interior to the Department of Commerce under Reorganization Plan Number 4 of 1970. See Reorg. Plan No. 4 of 1970, • 1(a), 3 C.F.R. 202 (1970), *reprinted in* 15 U.S.C. • 1511, at 995 (1988).

<sup>35</sup> Endangered and Threatened Species Listing and Recovery Priority Guidelines, 48 Fed. Reg. 43,098,

approach that emphasizes the magnitude (high to low) and immediacy (imminent and non-imminent) of the threats facing the species as the key determinants.<sup>36</sup>

The case-by-case approach does not, however, distinguish between the probability and time elements of risk, on the one hand, and the acceptability of the resulting risk, on the other. That is, the approach blends decisions on the likelihood of extinction over some duration with the judgment that some (generally unstated) degree of risk is acceptable. This reduces the transparency of the decisionmaking and -- as the examples suggest -- doubtless results in inconsistent decisions on the status of different species.

These statutory factors encourage a focus on specificity that has obscured the underlying questions of risk -- the probability of extinction over some time -- and its ethical dimension. Although the USFWS and NOAA have the authority to adopt a policy specifying the factors to be considered in determining the probability and time components of the risk assessment, they have not chosen to do so. In the absence of a more explicit quantification of these elements and a specification of the degree of risk that is ethically acceptable, agency decisions delisting species as recovered provide the best available information on what "recovery" means operationally.

### **3. Defining "Recovery" Operationally by Delisting Species**

As noted, the decision to delist a species as recovered is made through a risk assessment that procedurally and substantively mirrors the decision to list the species: both require an evaluation of the species' status under the five statutory threat factors.<sup>37</sup> Contrary to Heraclitus famous admonition, however, the path up is not the same as the

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43,100 (1983).

<sup>36</sup> *Id.*

<sup>37</sup> "[T]he same five statutory factors must be addressed in delisting as in listing." *Defenders of Wildlife v. Babbitt*, 130 F. Supp. 2d 121, 133 (D.D.C. 2001) (quoting *Fund for Animals v. Babbitt*, 903 F. Supp. 96, 111 (D.D.C. 1995)). See also *National Wildlife Federation v. Norton*, 386 F. Supp. 2d 553, 558 (D. Vt. 2005).

path down.<sup>38</sup> Two differences between listing and delisting are worthy of note. The first is the amount of information that is available. When a species is proposed for listing, generally relatively little is known about it. By the time it is proposed for delisting, on the other hand, there is a body of data on the management actions that have proven to be successful in recovering the species.

The second difference is that the decision to delist a species removes the risk management provided by the ESA. As a result, the risk-assessment required in a delisting decision necessarily must include an evaluation of the risk management that will be available if the species were delisted. That is, the agency must decide not only that the species is no longer threatened (that the probability of extinction over the foreseeable future is acceptable), but also that the removing the ESA's risk-management mechanisms will not render the species again at-risk.<sup>39</sup> Is the ESA all that is preventing the species' extinction?<sup>40</sup>

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<sup>38</sup> See G.S. KIRK ET AL., *THE PRESOCRATIC PHILOSOPHERS* 188 (2d ed. 1983) ("The path up and down is one and the same."). The USFWS and NOAA have acknowledged this difference in adopting the "Policy for Evaluation of Conservation Efforts when Making Listing Decisions" (PECE). Policy for Evaluation of Conservation Efforts when Making Listing Decisions, 68 Fed. Reg. 15,100 (2003). In response to the suggestion of several commenters on the draft Policy that it be applied to all decisions, the agencies stated that "a recovery plan is the appropriate vehicle to provide guidance on actions necessary to delist a species." *Id.* at 15,101. Similarly, the Quantitative Working Group also reported that it was divided on whether the standards for listing should also be applied to delisting and reclassification decisions and therefore recommended considering those criteria separately. Demaster et al., *supra* note 20, at 5.

<sup>39</sup> This requirement is included within the five-factor analysis. The fourth factor requires the agency to evaluate "the inadequacy of existing regulatory mechanisms." 16 U.S.C. § 1533(a)(1)(D).

<sup>40</sup> This second difference highlights the irony of the ESA: the Act is a powerful, focused statute that can bring species back from the brink of extinction, but this power can itself make the statute irreplaceable because neither federal nor state law provides significant, focused protection against threats such as habitat degradation and nonnative species. Wilcove et al., *Leading Threats*, note 12 *supra*; Wilcove et al., *Quantifying Threats*, note 12 *supra*. Although there are other, generally applicable statutes that protect habitat (e.g., the Clean Water Act, 33 U.S.C. §§ 1251-1387, and local zoning regulations), such statutes are unlikely to be sufficient to protect most listed species because such statutes only incidentally protect habitat in the process of advancing other objectives (such as obtaining clean water). As a result, these statutes do not provide assurances of ongoing, species-specific management. Existing statutes on nonnative species (e.g., the Nonindigenous Aquatic Nuisance Prevention and Control Act, 16 U.S.C. §§ 4701-4741, and state noxious weed control programs) are also insufficiently tailored to be of much assistance. The problem is that specific species face specific threats, threats that generally require continuing monitoring and risk management -- actions that are not available under statutes such as the Clean Water Act. Holly Doremus, *Delisting Endangered Species: An Aspirational Goal, Not a Realistic Expectation*, 30 *Envtl. L. Rep. (Envtl. L. Inst.)* 10,434 (2000); Holly Doremus & Joel E. Pagel, *Why Listing May Be Forever: Perspectives on Delisting under the U.S. Endangered Species Act*, 15 *CONSERVATION BIOLOGY* 1258 (2001); Jack E. Williams et al.,

A review of the decisions delisting species as recovered demonstrates that recovery has two elements. The first is *demographic*: the species' population must have increased to (or at least stabilized at<sup>41</sup>) a point at which it is both sufficiently large and dispersed to reduce the risk that it will be extinguished by stochastic events to a reasonable level.<sup>42</sup> The second requirement is *risk-management*: there must be sufficient regulatory or other conservation mechanisms in place to provide reasonable assurances that the species will not be again placed at risk by removing the ESA's protection. The "reasonable" qualification in both statements is, of course, the ethical judgment that the remaining risk of extinction is acceptable.

## A. The Numerical Context

Currently, 1351 U.S. species are listed as either threatened or endangered;<sup>43</sup> 16

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*Prospects for Recovering Endemic Fishes Pursuant to the U.S. Endangered Species Act*, 30:6 FISHERIES 24, 24 (2005).

<sup>41</sup> If a species's population has stabilized, the species may have recovered if there is ongoing, effective risk management.

<sup>42</sup> See note XXX and accompanying text *supra*.

<sup>43</sup> U.S. Fish & Wildlife Service, *Box Score* (visited Oct. 29, 2007) <[http://ecos.fws.gov/tess\\_public/Boxscore.do](http://ecos.fws.gov/tess_public/Boxscore.do)>. Of these, 1046 are listed as endangered and 305 as threatened. *Id.* The total, worldwide list is 1921 species. *Id.*

These numbers are often cited by the Act's opponents as demonstrating that it is "not working." *E.g.*, House Committee on Resources, *Press Release: Pombo Releases Oversight Report on ESA Implementation* (May 17, 2005) (visited Sept. 3, 2005) <<http://kwua.org./news/PRpomboESA051705.htm>>. The assertion is either overly simplistic or actively disingenuous. For example, the Government Accountability Office subsequently concluded that Pombo's figures "are not a good gauge of the act's success or failure." Government Accountability Office, *Endangered Species: Time and Costs Required to Recover Species Are Largely Unknown* 1 (visited Apr. 6, 2006) <available at <http://www.gao.gov/new.items/d06463r.pdf>>. Given the complexity of risks faced by species, *e.g.*, Wilcove et al., *Leading Threats*, note 12 *supra*; Wilcove et al., *Quantifying Threats*, note 12 *supra*; the frequent lack of meaningful alternative legal protection; the fact that it took many species decades or centuries to reach a point of acute vulnerability and the extremely meager funding of recovery efforts, Julie K. Miller et al., *The Endangered Species Act: Dollars and Sense?*, 52 *BioSci.* 163 (2002); it is unrealistic to expect that many species would have recovered over the 30 years the Act has been in effect. See generally Timothy D. Male & Michael J. Bean, *Measuring Progress in US Endangered Species Conservation*, 8 *ECOLOGY LETTERS* 986 (2005); Martin F. Taylor, Kieran F. Suckling, & Jeffrey J. Rachlinski, *The Effectiveness of the Endangered Species Act: A Quantitative Analysis*, 55 *BioSci.* 360 (2005).

A better measure of the Act's success is its ability to prevent extinction. Based on the risk of extinction, it is probable that the Act has prevented 227 species from going extinct. J. Michael Scott et al., *By the Numbers, in THE ENDANGERED SPECIES ACT AT THIRTY*, *supra* note 9, at 16, 31-32; Mark W. Schwartz, *Choosing the Appropriate Scale of Reserves for Conservation*, 30 *ANN. REV. ECOLOGY & SYSTEMATICS* 83, 86-87 (1999).



species have been delisted as recovered;<sup>44</sup> an additional 16 species have made sufficient progress toward recovery to be reclassified from endangered to threatened.<sup>45</sup> Until the most recent delistings,<sup>46</sup> at least, the recovered species shared similar demographic profiles and fell along a continuum defined by the type of risk management that was required to address the post-delisting threats the species faced. At one end are species such as the Aleutian cackling goose, which can be adequately protected by previously existing state and federal regulatory and monitoring mechanisms. At the other end are species, typified by Robbins' cinquefoil and the Columbia white-tailed deer, that require the development of new species-specific risk-management programs.

## **B. Risk Management Through Existing Regulatory Mechanisms**

The Aleutian cackling goose was listed as endangered in 1967 as a result of population declines largely caused by the introduction of a predator (foxes) onto its

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<sup>44</sup> The 16 species are: American alligator, brown pelican, Palau fantail flycatcher, Palau ground dove, Palau owl, gray whale, arctic peregrine falcon, American peregrine falcon, Aleutian Canada goose, Robbins' cinquefoil, Columbia white-tailed Deer [Douglas County DPS], Hoover's woolly-star, Eggert's sunflower, gray wolf [Minnesota population = Western Great Lakes DPS], grizzly bear [Yellowstone Ecosystem DPS], and bald eagle.

<sup>45</sup> The 16 species that have been downlisted are: Apache Trout, Lahontan cutthroat trout, Paiute cutthroat trout, greenback cutthroat trout, Utah prairie dog, snail darter, Louisiana pearlshell, Siler pincushion cactus, small whorled pogonia, Virginia round-leaf birch, MacFarlane's four-o'clock, Maguire daisy, large-flowered skullcap, Missouri bladderpod, Gila trout, and American crocodile.

<sup>46</sup> Writing a law review article is at least partially an academic exercise -- even if one hopes to change a small bit of the world. Since my purpose is to demonstrate that recovery involves both biological/demographic and legal/risk management components, the following analysis assumes that the agency's statements about individual species' demographic and risk-management status are accurate descriptions of the science. I recognize that this is a counterfactual statement. See Office of Inspector General, Department of the Interior, Report of Investigation: Julie MacDonald, Deputy Assistant Secretary, Fish, Wildlife and Parks (available at <[http://www.biologicaldiversity.org/swcbd/programs/esa/pdfs/DOI-IG-Report\\_JM.pdf](http://www.biologicaldiversity.org/swcbd/programs/esa/pdfs/DOI-IG-Report_JM.pdf)> (visited Apr. 17, 2007); U.S. Fish & Wildlife Service, *News Release: U.S. Fish and Wildlife Service to Review 8 Endangered Species Decisions* (July 20, 2007) (available at <<http://www/fws/gov/home/ESA.Review.NR.Final.pdf>> (visited Aug. 17, 2007); see also Center for Biological Diversity v. U.S. Fish & Wildlife Service, 2005 WL 2000928, at 15 (N.D. Cal. Aug. 19, 2005); Erik Stokstad, *Appointee "Reshaped" Science, Says Report*, 316 SCI. 37 (2007); Jo Becker & Barton Gellman, *Leaving No Tracks*, WASH. POST., June 27, 2007, at A1. See generally Dale D. Goble, *Recovery in a Cynical Time -- With Apologies to Eric Arthur Blair*, 82 U. WASH. L. REV. 581 (2007).

nesting grounds.<sup>47</sup> Removal of the foxes from these islands, reintroduction of the species onto the now-fox-free islands, and hunting closures on the species' wintering grounds in Oregon and California allowed the species' population to climb from 790 individuals in 1975 to 5,800 in 1989 (when it was reclassified as threatened<sup>48</sup>) to 36,978 in 2000 (just before the species was delisted in 2001<sup>49</sup>). At the same time, the breeding range increased from one to more than six islands.<sup>50</sup> This population increase and dispersal reduced the demographic threat to the species from a stochastic event to a acceptable level, thus meeting the threshold demographic requirement.

Increased population is a necessary condition for delisting, but it is not in itself sufficient. As noted, if the ESA's focused protection is all that is preventing the species from being foreseeably at risk of extinction, it cannot be delisted.<sup>51</sup> Thus, the second prong of the inquiry: are there sufficient risk-management mechanisms to provide reasonable assurances that the species will not again be unreasonably at risk of extinction?

The necessary, on-going risk management for the Aleutian cackling goose was stitched together from a number of existing regulatory mechanisms. The species' nesting grounds are on the Alaska Maritime National Wildlife Refuge;<sup>52</sup> the USFWS

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<sup>47</sup> The species was listed under the Endangered Species Preservation Act (ESPA), a predecessor of the ESA. Endangered Species Preservation Act, Pub. L. No. 89-669, 80 Stat. 926, *repealed by* Endangered Species Act of 1973, Pub. L. No. 93-205, • 14, 87 Stat. 884, 903 (1973). Native Fish and Wildlife: Endangered Species, 32 Fed. Reg. 4001 (1967). Under the ESPA, the Secretary was not required to discuss the risk factors affecting the species; that discussion can be found in the proposal to reclassify the species from endangered to threatened in 1989. See Proposed Reclassification of the Aleutian Canada Goose from Endangered to Threatened, 54 Fed. Reg. 40,142 (1989). The species' name has recently been changed from Aleutian Canada goose to Aleutian cackling goose.

<sup>48</sup> 54 Fed. Reg. at 40,142.

<sup>49</sup> Final Rule to Remove the Aleutian Canada Goose from the Federal List of Endangered and Threatened Wildlife, 66 Fed. Reg. 15,643, 15,645 (2001) [hereinafter cited as Aleutian Canada Goose Delisting].

<sup>50</sup> *Id.*

<sup>51</sup> 16 U.S.C. • 1533(a)(1) (delisting must consider "the inadequacy of existing regulatory mechanisms"); see *also id.* • 1536(a)(2) ("Each Federal agency shall ... insure that any action ... carried out by such agency ... is not likely to jeopardize the continued existence of any [listed] species.").

<sup>52</sup> See U.S. Fish & Wildlife Service - Alaska, *Alaska Maritime National Wildlife Refuge* (visited Jan. 24, 2006)

thus has the authority to take management actions that might be necessary to maintain the species's numbers and distribution, including removing foxes from additional islands.<sup>53</sup> On the species' wintering grounds, feeding and roosting habitat was acquired, either as fee interests or through conservation easements.<sup>54</sup> More significantly, the species's status is monitored and take is managed by the federal and state governments through the Pacific Flyway Council,<sup>55</sup> a regulatory entity established under the Migratory Bird Treaty Act (MBTA).<sup>56</sup>

The Aleutian cackling goose thus could be delisted because (1) its numbers had increased and its population had dispersed sufficiently to reduce the risk of stochastic events to an acceptable level and (2) a conservation-management system was created that had sufficient regulatory power to prevent the species from slipping back into an at-risk status.

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<<http://alaska.fws.gov/nwr/akmar/index.htm>>.

<sup>53</sup> See 16 U.S.C. §§ 668dd-668ee. See also U.S. Fish & Wildlife Service - Alaska, *Wildlife: Alien / Invasive Species* (visited Jan. 24, 2006) <<http://alaska.fws.gov/nwr/akmar/wildlife-wildlands/nonnative/alien.htm>>.

<sup>54</sup> Aleutian Canada Goose Delisting, *supra* note 49, at 15,651-52.

<sup>55</sup> The Council is a one of the regional bodies established under the Migratory Bird Treaty Act that represent federal, state, and provincial fish and game agencies. The Pacific Flyway council is composed of the western states and provinces. See Pacific Flyway Council, *Coordinated Management* (visited Sept. 9, 2005) <<http://pacificflyway.gov/Index.asp>>. The Council has prepared a management plan for the Aleutian Canada goose. See Pacific Flyway Council, *Pacific Flyway Management Plan for the Aleutian Canada Goose* (July 30, 1999) (unpublished report available at <<http://pacificflyway.gov/Abstracts.asp#acg>>).

<sup>56</sup> 16 U.S.C. §§ 703-711. The MBTA federalized the conservation of migratory birds: i. The Act begins, for example, with a broad declaration that "it shall be unlawful to ... take, ... kill, ... possess, ... sell, ... ship, [or] export ... any migratory bird." *Id.* § 703. Federal protection extends to "any product ... which ... is composed in whole or part, of any such bird or any part, nest or egg thereof." *Id.* Finally, the species is also listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and thus is protected against international commerce. Convention on International Trade in Endangered Species of Wild Fauna and Flora, Mar. 3, 1973, 27 U.S.T. 1087, 993 U.N.T.S. 243. The Convention embodies a system of import and export permits that provide the basis for a control structure to regulate international commerce in species designated for protection in one of the Convention's three appendices. *Id.* arts. II, §§ 1-3, III, §§ 2-4, IV, § 2. Appendix I includes "all species threatened with extinction, which are, or may be affected by trade," *id.* art. II, § 1; species listed in Appendix may not be traded for commercial purposes. Appendix II species are those that may become threatened with extinction "unless trade in specimens of such species is subject to strict regulation" or species that closely resemble other Appendix II species, *id.* art. II, § 2; these species may be traded subject to restrictions. Appendix III includes all species that have been identified by a party to Convention as subject to regulation within its jurisdiction, *id.* art. II, § 3.

Several delisted species share two characteristics with the Aleutian cackling goose: their decline was the result primarily of a specific, remediable, threat and the risk management necessary to delist the species after its population recovered could be provided through existing regulatory mechanisms. For example, the gray whale and the American alligator were listed primarily due to over-harvesting.<sup>57</sup> Following listing and implementation of take prohibitions, the species's populations increased. The necessary risk management to guard against recurrence of the demographic threat posed by overharvest has, in both cases, been provided by a number of existing regulatory mechanisms, including the International Whaling Commission,<sup>58</sup> the Marine Mammal Protection Act (MMPA),<sup>59</sup> and the Lacey Act.<sup>60</sup> Similarly, the American peregrine falcon, the arctic peregrine falcon, and the brown pelican were at risk of extinction primarily from exposure to organochlorine pesticides (e.g., dichloro-diphenyl-trichloroethane [DDT]).<sup>61</sup> Banning DDT (and an intensive reintroduction

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<sup>57</sup> The gray whale was listed because of severe depletion as a result of harvest, particularly shore-based whaling operations. Gray Whale, 58 Fed. Reg. 3121, 3125 (1993). The alligator was listed "due to concern over poorly regulated or unregulated harvests." Reclassification of American Alligator as Threatened Due to Similarity of Appearance Throughout the Remainder of its Range, 52 Fed. Reg. 21,059, 21,059 (1987) [hereinafter cited as Alligator Reclassification].

<sup>58</sup> The International Whaling Commission was created under the International Convention for the Regulation of Whaling, Dec. 2, 1946, 10 U.S.T. 952, 161 U.N.T.S. 72. In addition to the Commission, the gray whale remains subject to an extensive array of regulatory mechanisms. At the international level, the species is also covered by CITES. See note 56 *supra*.

<sup>59</sup> The species is also protected under federal law when it is within U.S. territorial waters, including most significantly the take prohibitions of the MMPA. 16 U.S.C. §§ 1361-1407 (2000). Additional federal laws are also applicable and offer additional protection: the National Environmental Policy Act, 42 U.S.C. §§ 4321, 4331-4335 (2000); the Clean Water Act, 33 U.S.C. §§ 1251-1387 (2000); the Act to Prevent Pollution from Ships, 33 U.S.C. §§ 1901-1909 (2000); the Marine Protection, Research, and Sanctuaries Act, 33 U.S.C. §§ 1401-1447f, 2801-2805 (2000); the Oil Pollution Act of 1990, 33 U.S.C. §§ 2701-2719, 2731-2738, 2751-2761 (2000); and the Outer Continental Shelf Lands Act Amendments, 43 U.S.C. §§ 1344-1355, 1801-1802, 1841-1845, 1862-1866 (2000).

<sup>60</sup> 16 U.S.C. §§ 701, 3371-3378 (2000). The Lacey Act prohibits interstate shipment of wildlife taken contrary to state or federal law. The alligator continues to be managed pursuant two additional federal regulatory mechanisms: a special rule promulgated under the ESA's similarity of appearance provisions (since the alligator is similar to other crocodilians which still are listed), 50 C.F.R. § 17.42 (2004); and listing under Appendix I of CITES, which prohibits international commerce in the species. The USFWS concluded that these "federally enforced laws and regulations ... require that any harvest options by States meet certain minimum conditions to insure against a recurrence of the original problems which prompted listing, *i.e.*, excessive take." Alligator Reclassification, *supra* note 57, at 21,062.

<sup>61</sup> Exposure to DDT caused egg-shell thinning and precluded successful nesting. Final Rule to Remove the

program for peregrines) led to population recovery. Although the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)<sup>62</sup> delegates the Environmental Protection Agency sufficient authority to screen chemicals to prevent the re-introduction of organochlorines, additional risks had emerged since the species listings -- and other regulatory mechanisms were available to address these potential limiting factors. In delisting the species, the USFWS cited the MBTA<sup>63</sup> and CITES,<sup>64</sup> which provide protection against take and commerce; various federal land management statutes which gave the land-managing agencies sufficient authority to protect the species's habitat;<sup>65</sup> as well as state regulatory mechanisms.<sup>66</sup> The combination of these mechanisms provided sufficient assurance of ongoing risk management to satisfy the agency that the species was no longer threatened.

This is the basic pattern: recovery has both demographic and risk-management requirements. That is, the species must not only have recovered biologically, it must

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American Peregrine Falcon from the Federal List of Endangered and Threatened Wildlife, and To Remove the Similarity of Appearance Provision for Free-flying Peregrines in the Conterminous United States, 64 Fed. Reg. 46,542, 46,452 (1999); Removal of Arctic Peregrine Falcon from the List of Endangered and Threatened Wildlife, 59 Fed. Reg. 50,796 (1994); Removal of the Brown Pelican in the Southeastern United States from the List of Endangered and Threatened Wildlife, 50 Fed. Reg. 4938, 4938 (1985) (organochlorine pesticides were also directly toxic to pelicans). Organochlorine pesticides such as DDT were put into widespread use World War II. This class of chemicals did not break down readily in the environment and thus were concentrated as one moved up the food chain (bioaccumulation). This produced concentrations of the primary metabolite of DDT (dichlorophenyl-dichlorophenylene [DDE]) in the fatty tissues of female birds, which impaired calcium release for egg shell formation. Although the use of DDT was banned in the United States on December 31, 1972, organochlorines remained a problem due to the chemicals persistence in the environment. Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify the Bald Eagle from Endangered to Threatened in All of the Lower 48 States, 60 Fed. Reg. 35,999, 36,000 (1995).

<sup>62</sup> 7 U.S.C. §§ 136-136y.

<sup>63</sup> 64 Fed. Reg. at 46,554-55; 59 Fed. Reg. at 50,800; 50 Fed. Reg. at 4941-42.

<sup>64</sup> 64 Fed. Reg. at 46,554-55; 59 Fed. Reg. at 50,801.

<sup>65</sup> For the peregrine falcon, the agency cited the National Forest Management Act, 16 U.S.C. §§ 1600-1616; Federal Land Policy and Management Act, 43 U.S.C. §§ 1701-1784; and the various management requirements applicable to the National Wildlife Refuge System, see DALE D. GOBLE & ERIC T. FREYFOGLE, WILDLIFE LAW 219-37 (2002). For the brown pelican, the statutes are the Estuary Protection Act, 16 U.S.C. 1221-1226 (2000), and the refuge system statutes.

<sup>66</sup> 64 Fed. Reg. at 46,555; 50 Fed. Reg. at 4941-42.

also be protected into the future against a recurrence of the risks that threatened its existence. For this group of species, the requisite risk management was provided through existing conservation and regulatory mechanisms such as the MBTA or the International Convention for the Regulation of Whaling. These mechanisms were sufficient because the species faced threat that was remediable through traditional wildlife management tools such as take restrictions or common regulatory approaches such as banning a toxic substance. In addition, there was another factor at work that may have trumped the rest: geese and whales and falcons and pelicans are habitat generalists that can flourish in human-impacted environments -- the last peregrine that I have seen was in Washington, D.C.

Most species, however, are not like peregrine falcons: they cannot be delisted because they cannot maintain recovered populations given the lack of existing and effective risk management mechanisms to address the threats they face. This reflects the fact that most species are at risk of threats -- primarily habitat loss and invasive competitors or predators -- that cannot be eliminated but only managed. Such continuing conservation management requires species-specific risk-management schemes. These species demonstrate the irony of the ESA.

### **C. Risk Management Through Individualized Regulatory Mechanisms**

Five delisted species -- Robbins' cinquefoil, Columbian white-tailed deer, bald eagle, Hoover's woolly-star, and the Great Lakes distinct population segment (DPS)<sup>67</sup> of gray wolf -- are examples of species that lacked sufficient protection under existing regulatory or other conservation mechanisms. Like most species, four of these species

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<sup>67</sup> The Act's definition of "species" defines the term to include "any distinct population segment of any species of vertebrate fish or wildlife." 16 U.S.C. • 1532(16). In 1996, the USFWS and NOAA adopted a policy that described a process for denominating DPS. Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act, 61 Fed. Reg. 4722 (1996). The policy on DPS specifies three elements to be considered in designating a DPS: "[1] Discreteness of the population segment in relation to the remainder of the species to which it belongs; [2] The significance of the population segment to the species to which it belongs; and [3] The population segment's conservation status in relation to the Act's standards for listing." *Id.* at 4725.

require protection against habitat degradation and nonnative species;<sup>68</sup> they require ongoing risk management beyond the monitoring and take restrictions required by the goose. The fifth species -- the gray wolf -- is a special (though not unique) case: although it is a habitat generalist that can thrive in a wide variety of habitats, the species requires additional management because it troubles and, therefore, is killed by humans.<sup>69</sup> Delisting these species has required a different approach to risk management and thus offers a more nuanced and broadly applicable understanding of recovery.

#### **i. Robbins' Cinquefoil**

Robbins' cinquefoil is a long-lived, dwarf member of the rose family that was historically restricted to three sites in the White Mountains of New Hampshire and Vermont. At the time of listing, the species had been reduced to a single population (Monroe Flats) in New Hampshire. The site was bisected by the Appalachian Trail and the species' abundance had been substantially reduced due to trampling and habitat destruction caused by hikers.<sup>70</sup> It is this threat that differs from those faced by the goose or the whale: while removing foxes from an island or prohibiting the killing of whales removes the threat that led to near extinction, hikers require continuing, carefully structured management.

Following listing of the species in 1980, three additional populations of the

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<sup>68</sup> Wilcove et al., *Leading Threats*, note 12 *supra*; Wilcove et al., *Quantifying Threats*, note 12 *supra*. All five species fit this pattern if Euro-Americans are included in the list of invasive species.

<sup>69</sup> See Dale D. Goble, *Of Wolves and Welfare Ranching*, 16 HARV. ENVTL. L. REV. 101 (1992).

<sup>70</sup> Determination of *Potentilla* [sic] *robbinsiana* to Be an Endangered Species, with Critical Habitat, 45 Fed. Reg. 61,944, 61,945 (1980). In addition, the species had been the object of intense collection activities: a detailed study found "over 850 plants in herbaria collections worldwide, which represents one of the most extensive collections known for a single species." Removal of *Potentilla robbinsiana* (Robbins' cinquefoil) from the Federal List of Endangered and Threatened Plants, 67 Fed. Reg. 54,968, 54,973 (2002) [hereinafter cited as Cinquefoil Delisting]. Commercial collecting activities ended in the early 1900s and scientific collection has also decreased as scientists have become more aware of the impacts of their activities. *Id.*

species were established; the total number of individuals grew from less than 2,000 to more than 14,000 specimens in the four separate populations.<sup>71</sup> The increased number of individuals and the physical separation of the populations made the species less susceptible to a random, catastrophic events and thus met the threshold demographic requirement.<sup>72</sup>

The risk-management component was satisfied through a series of actions that secured the species' habitat and assured ongoing management of that habitat to meet the species's biological needs. The USFWS, the landowner -- U.S. Forest Service (USFS) -- and a conservation organization -- the Appalachian Mountain Club -- took several steps to reduce the impact of hikers: the trail was re-routed away from the original population and a wall was constructed around that population and posted with "closed entry" signs. In addition, a series of conservation-management agreements provided for ongoing monitoring and risk-management for this population.<sup>73</sup> A Club naturalist is present during the summer at a hut near the population and, along with other staff at the hut, monitors human interaction with the population and provides education on its status and requirements.<sup>74</sup> The USFWS and the USFS also entered into a memorandum of understanding (MOU) for the conservation of the species under which the USFS agreed to continue to monitor and management the populations after delisting.<sup>75</sup>

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<sup>71</sup> 67 Fed. Reg. at 54,973.

<sup>72</sup> In addition, seed is collected annually for storage in a seed bank. *Id.* at 54,970.

<sup>73</sup> The location of the three other populations has not been disclosed so as not to call attention to them. *Id.* at 54,973.

<sup>74</sup> *Id.* at 54,970, 54,972-73.

<sup>75</sup> The USFS agreed to provide "long-term protection on the Forest irrespective of the species standing under the Endangered Species Act." U.S. Forest Service and U.S. Fish & Wildlife Service, Memorandum of Understanding for the Conservation of Robbins' Cinquefoil (*Potentilla robbinsiana*) 1 (Dec. 2, 1994). The USFWS agreed to maintain the Monroe Flats habitat, "vigorously protect[]" the species from take through human disturbance, to train personnel, and to provide educational and interpretational information to visitors to the forest. *Id.* at 3.



Robbins' cinquefoil thus was delisted because (1) translocation and habitat restoration had increased the number of individuals and populations sufficiently to provide *reasonable* assurance against stochastic risk and (2) the threats requiring continuing risk management -- trampling and habitat destruction by hikers -- had also been reduced to a reasonable level (a) through an agreement with a conservation organization to provide monitoring and ongoing educational activities and (b) through an MOU with the land-managing agency that the habitat would be managed to maintain its biological value to the species.

## **ii. The Columbian White-tailed Deer**

The Columbian white-tailed deer further illustrates the range of conservation-management activities that may be required following delisting. The species was once common in the bottomlands and prairie woodlands of the lower Columbia, Willamette, and Umpqua River basins in western Oregon and southwestern Washington. It declined rapidly following Euro-American settlement as a result of habitat loss, uncontrolled sport and commercial hunting, and "perhaps other factors."<sup>76</sup> By the early 1900s, the species had been reduced to two, disjunct populations: one along the lower Columbia River and the other in the Umpqua Valley of Douglas County in southern Oregon. Following its listing under a predecessor of the ESA in 1967,<sup>77</sup> the Douglas County deer population increased from an estimated 400-500 animals in 1970<sup>78</sup> to about 6,070 animals in 2002 as a result of the recovery activities initiated pursuant to the ESA.<sup>79</sup> Since the Columbia

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<sup>76</sup> Final Rule to Remove the Douglas County Distinct Population Segment of Columbian White-tailed Deer from the Federal List of Endangered and Threatened Wildlife, 68 Fed. Reg. 43,647, 43,647 (2003) [hereinafter cited as Deer Delisting].

<sup>77</sup> Native Fish and Wildlife; Endangered Species, 32 Fed. Reg. 4001 (1967).

<sup>78</sup> Endangered and Threatened Wildlife and Plants; Proposed Rule to Delist the Douglas County Population of Columbian White-Tailed Deer, 64 Fed. Reg. 25,623, 25,264 (1999).

<sup>79</sup> Deer delisting, *supra* note 79, at 43,648.

River population had not increased significantly, the USFWS designated the two populations as DPS and delisted the Douglas County DPS as recovered.<sup>80</sup> Although there was only a single population in each DPS,<sup>81</sup> the increased number of individuals and the concomitant range expansion of the species in Douglas County led the agency to conclude that the DPS faced a substantially reduced -- and acceptable -- risk from a stochastic event such as a forest fire.

The species's risk-management requirements were met through a variety of regulatory and other conservation mechanisms that the agency concluded were sufficient to manage both the recurrence of the threat factors that had led to listing and new threats that had emerged. Threat factors such as overutilization from hunting were addressed through traditional game management tools (as was the case with both the goose and the whale). The threat of habitat loss through land conversion to agriculture and residential homesites, however, differs from traditional wildlife management in at least two relevant ways. First, given human demographic trends, the threat is unlikely to abate in the foreseeable future. Second, it is not a question of removing the predator or the poison. Even if land were set aside permanently, habitat loss requires ongoing monitoring and management because nature is not static -- particularly in an age of global climate change.<sup>82</sup> Management thus was all the more crucial. Unfortunately, there were no existing risk-management mechanisms (such as the MBTA) that could monitor and manage the range of risks facing the species from the modification of its habitat. Something more was required.

The USFWS addressed this need for additional risk management by requiring at

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<sup>80</sup> *Id.*

<sup>81</sup> The USFWS summarily rejected public comments contending that a third population should be established prior to delisting. *Id.* at 43,652-53.

<sup>82</sup> Habitat changes ripple across space and time because ecosystems respond slowly and often in nonlinear ways; the effect of a change may not be immediately apparent. See generally Dale D. Goble, *What are slugs good for? Ecosystem Services and the Conservation of Biodiversity*, 22 J. LAND USE & ENVTL. L. 411 (2007).

least 5,000 acres of "secure habitat" as a recovery goal. The agency defined "secure" as "areas that are protected from adverse human activities ... in the foreseeable future, and that are relatively safe from natural phenomena that would destroy their value to the subspecies."<sup>83</sup> This definition, it should be noted, has both a legal and a biological component: the habitat must be legally protected against adverse human actions and it must be managed to continue to meet the biological requirements of the species.

The legal component could be satisfied, the agency concluded, through "zoning ordinances, land-use planning, parks and greenbelts, agreements, memoranda of understanding, and other mechanisms available to local jurisdictions,"<sup>84</sup> as well as through public ownership of the land or protection of habitat by private conservation organizations through "easements, leases, acquisitions, donations, or trusts."<sup>85</sup> In response, public entities (primarily the Bureau of Land Management (BLM) and the county) acquired over 7,000 acres of habitat.<sup>86</sup> The county also adopted a Columbian White-tailed Deer Habitat Protection Program that imposed land-use controls, including minimum lot sizes and set-back requirements in deer habitat.<sup>87</sup>

Simply setting aside habitat is insufficient, however, because there must also be legal assurances that that habitat will be managed to continue to meet the biological needs of the species. Risk management, in other words, requires *management*. For the Columbian white-tailed deer, the largest publicly owned parcel of habitat is the BLM-managed North Bank Habitat Management Area, a 7,000-acre former cattle ranch that

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<sup>83</sup> Deer Delisting, *supra* note 76, at 43,651.

<sup>84</sup> *Id.*

<sup>85</sup> *Id.* The security of these various tools is likely to vary widely. Federal acquisition of land is probably the most secure; acquisition by private conservation organizations is also likely to be relatively secure (depending upon funding); local politics, on the other hand, may be hostile to the conservation needs of the species or prove unwilling to expend the necessary funds.

<sup>86</sup> *Id.* at 43,653-54.

<sup>87</sup> *Id.* at 43,654-55.

BLM acquired to provide habitat for the species.<sup>88</sup> The BLM management plan for the area includes controlled burns, grazing modifications, and restoration activities to increase the quality of habitat to the deer.<sup>89</sup> In addition, the Douglas County Parks Department manages a 1,100-acre park as a wildlife refuge and a working ranch to provide habitat for the species.<sup>90</sup>

These actions led the USFWS to conclude that the Douglas County population of Columbian white-tailed deer could be delisted because (1) its population and distribution had increased to the point that the risk of a stochastic event was reduced to a reasonable level, thus satisfying the threshold demographic requirement; (2) the threat facing the species that required continuing risk management -- maintenance of sufficient suitable habitat -- was also reduced to a reasonable level through (a) legal protection of the habitat and (b) agreements with the landowners or managers of that habitat to ensure that it would be managed to maintain its biological value to the species.<sup>91</sup>

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<sup>88</sup> *Id.* at 43,653.

<sup>89</sup> *Id.* at 43,653-54.

<sup>90</sup> *Id.* at 43,654. The Nature Conservancy also manages a 35-acre site in part to provide deer habitat. *Id.*

<sup>91</sup> Hoover's woolly-star offers another variation on this basic pattern. The species is an annual herb in the phlox family that grows in the San Joaquin and Cuyama Valleys in California. Land conversion (oil, gas, and agricultural development, and urbanization) had extirpated several populations and left the remaining populations at-risk. Determination of Endangered or Threatened Status for Five Plants from the Southern San Joaquin Valley, 55 Fed. Reg. 29,361, 29,368, 29,363-64 (1990). In addition, the species was threatened by the federal land-managing agencies' practices such as introducing nonnative grasses to stabilize soil. *Id.* at 29,365.

The threats requiring continuing conservation management -- oil and gas development, urbanization, grazing, agricultural conversion -- were reduced to a reasonable level through (1) an extensive reserve network of secure habitats under federal, state, and private management (2) coupled with commitment by the primary land-managing agency to "ensure that actions they authorize, fund, or carry out do not contribute to the need to re-list the species." Removing *Eriastrum hooveri* (Hoover's woolly-star) from the Federal List of Endangered and Threatened Species, 68 Fed. Reg. 57,829, 57,832 (2003); see also *id.* at 57,835-36. The USFWS noted that such "specific commitments [are] needed to protect the populations from incompatible uses such as heavy oilfield development, flooding or rising groundwater levels, and dense vegetation due to proliferation of nonnative plants or suppression of fires." *Id.* at 57,830. The combination of risk management provisions led the USFWS to conclude that the "management commitments by BLM will protect *Eriastrum hooveri* from [other risks] far into the future." *Id.* at 57,836.

### iii. The Bald Eagle

The recent delisting of the bald eagle<sup>92</sup> demonstrates the importance of the risk-management element of recovery. The species eagle is a striking example of the success of the ESA. Eagle populations have increased dramatically since it was listed in 1967: the number of breeding pairs increased from approximately 500 to 5748 (in 1998) and 9789 (in 2007).<sup>93</sup> In proposing to delist the species in 1999, the USFWS noted that "[t]he bald eagle population has essentially doubled every 7 to 8 years during the past 30 years."<sup>94</sup> Furthermore, the population increases were broadly distributed across 4 of the 5 recovery regions.<sup>95</sup> This increased population and distribution satisfied the demographic element of recovery. Indeed, most recovery region's met their population goals in the early 1990s.

The problem that delayed delisting the species was securing the necessary risk management. Delisting the bald eagle -- a species with continent-wide distribution -- raises difficulties that were not present with such narrowly distributed species as Robbins' cinquefoil and the Columbian white-tailed deer. It is possible to provide

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<sup>92</sup> Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States From the List of Endangered and Threatened Wildlife, 72 Fed. Reg. 37,346 (2007) [hereinafter cited as Eagle Delisting].

<sup>93</sup> *Id.* at 37,347-48.

<sup>94</sup> Endangered and Threatened Wildlife and Plants; Proposed Rule to Remove the Bald Eagle from the List of Endangered and Threatened Wildlife, 64 Fed. Reg. 36,454, 36,457 (1999) [hereinafter cited as Proposed Eagle Delisting].

<sup>95</sup> The Chesapeake Recovery Region had over 800 breeding pairs in 2003; the recovery goal (300 nesting pairs) was met in 1992. Endangered and Threatened Wildlife and Plants; Removing the Bald eagle in the Lower 48 states From the List of Endangered and Threatened Wildlife, 71 Fed. Reg. 8238, 8241-42 (2006). The Northern States Recovery Region had 2559 occupied breeding areas in 2000; the recovery goal of 1200 occupied areas was met in 1991. *Id.* at 8242. The Pacific Recovery Region had 1627 breeding pairs in 2001; the recovery goal of 800 pairs was met in 1990. *Id.* The Southeastern Recovery Region had 1500 occupied breeding areas in 2000; the recovery goal (1500 occupied areas) was met in 1997-2000. *Id.* The Southwestern Recovery Region had 46 occupied breeding areas in 2003; the report states that the recovery goal had been met in 2003, but is short on detail. *Id.* at 8242-43. The Southwestern Region has been problematic, perhaps because it is at the climatic edge of the species' tolerance. The decision to delist the Southwestern Recovery Region population has been challenged by the Center for Biological Diversity and the Maricopa Audubon Society. See Center for Biological Diversity, Bush Administration Suppressed Scientific Panel Recommendation to Keep Arizona Bald Eagle on Endangered Species List (Jan. 5, 2007) <<http://www.biologicaldiversity.org/swcbd/press/desert-bald-eagle-01-05-2007.html>> (visited Aug. 18, 2007).

specific, place-based risk management for all of the existing populations of the cinquefoil and the deer; to do the same for the existing populations of eagles is a far more complex task. But -- like the deer -- the dominant threat facing the eagle is habitat loss, a threat that is not remediable but only manageable. This is the classic example of a threat caused by diffuse, local decisions -- the "Tragedy of Fragmentation".<sup>96</sup> jurisdictional boundaries produce myopic decisions that can aggregate into a large decision that is never directly made. Although the Tragedy of the Commons is far better known,<sup>97</sup> it is the Tragedy of Fragmentation that poses a far greater risk to biodiversity. Consider, for example, coastal wetlands. Between 1950 and 1970, nearly 50 percent of the wetlands along the coasts of Connecticut and Massachusetts were destroyed, not as a result of a conscious decision, but through the conversion of hundreds of small tracts.<sup>98</sup> The fragmentation of ownership, with its resulting focus on individual decisions to develop individual tracts, obscured the overall impact of those decisions. This is the problem facing the eagle: the species's habitat preferences parallel our species's and decisions to permit the construction of a home are made in a setting that is unlikely to value eagles equally with increased tax revenue and the multiple advantages of "development." The importance of the decision to delist the eagle is the agency's response to the problems of continental distribution and local decisionmaking.

In re-listing the species in 1978,<sup>99</sup> the USFWS concluded that it was at risk of

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<sup>96</sup> Alfred E. Kahn, *The Tyranny of Small Decisions: Market Failures, Imperfections, and the Limits of Economics*, 19 KYKLOS 23 (1966); GOBLE & FREYFOGLE, *supra* note 65, at 1363-65; Dale D. Goble, *The Property Clause -- as if Biodiversity Mattered*, 75 U. COLO. L. REV. 1196 (2004).

<sup>97</sup> Garret Hardin, *The Tragedy of the Commons*, 162 SCI. 1243 (1968).

<sup>98</sup> William E. Odum, *Environmental Degradation and the Tyranny of Small Decisions*, 32 BioSci. 728, 728 (1982).

<sup>99</sup> The "southern bald eagle" was listed as endangered on March 11, 1967. Native Fish and Wildlife: Endangered Species, 32 Fed. Reg. 4001, 4001 (1967). Following enactment of the ESA, USFWS listed the entire species as endangered throughout the conterminous 48 states except in Washington, Oregon, Minnesota, Wisconsin, and Michigan where it was listed as threatened. Determination of Certain Bald Eagle Populations as Endangered or Threatened, 43 Fed. Reg. 6230 (1978).

extinction based upon three of the five threat factors. First, breeding habitat "has been considerably reduced" due to "[h]uman activities, such as logging, housing developments, and recreation."<sup>100</sup> Second, the species continued to be killed illegally.<sup>101</sup> Third, organochlorine pesticides continue to contribute to reproductive failure because of their persistence in the environment, particularly in the Northeast.<sup>102</sup> When the agency reexamined these threats in re-proposing to delist the species in 2006, it noted that eagles were still being poached and that some populations continued to experience depressed breeding success due to organochlorines.<sup>103</sup> Nonetheless, the agency concluded that neither was a serious threat to the species, in part because existing regulatory mechanisms were sufficient to manage these threats.<sup>104</sup> Once again, however, habitat loss presented a more complicated problem. Since the species depends upon large trees within 2 miles of water for nesting and will abandon nest when disturbed by human activity, the species is vulnerable to water-associated development and to human disturbances associated with water-based recreation.<sup>105</sup> Although concluding that habitat loss was not currently a limiting factor, the agency acknowledged that eagle habitat is often subject to development pressures and, therefore, that habitat loss may limit future growth of some populations. Nonetheless,

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<sup>100</sup> 43 Fed. Reg. at 6232.

<sup>101</sup> *Id.* at 6232 ("Shooting continues to be the leading cause of direct mortality in adult and immature bald eagles, accounting for 40 to 50 percent of the birds picked up by field personnel.").

<sup>102</sup> *Id.*

<sup>103</sup> Endangered and Threatened Wildlife and Plants; Removing the Bald Eagle in the Lower 48 States from the List of Endangered and Threatened Wildlife, 71 Fed. Reg. 8238, 8246, 8249 (2006) [hereinafter cited as Reopening Comment on Eagle Delisting].

<sup>104</sup> The agency noted that, although a low level of illegal shooting and trade in eagle feathers continues, these activities can be controlled under the Bald and Golden Eagle Protection Act (BGEPA), 16 U.S.C. §§ 668-668d, and the MBTA. 71 Fed. Reg. at 8246.

<sup>105</sup> Endangered and Threatened Wildlife and Plants; Reclassify the Bald Eagle from Endangered to Threatened in Most of the Lower 48 States, 59 Fed. Reg. 35,584, 35,589-90 (1994); Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify the Bald Eagle from Endangered to Threatened in All of the Lower 48 States, 60 Fed. Reg. 35,999, 36,006 (1995).

the agency was optimistic: "Despite these potential limitations, however, numerous factors ensure the bald eagle is not likely to become endangered *in the foreseeable future* by loss of suitable habitat."<sup>106</sup> The most important of these factors was the substantial amount of habitat on protected lands (*e.g.*, National Wildlife Refuges, National Parks, National Forests, state and private conservation lands) and the federal laws that "will remain in place after delisting to ensure the continued recovery of the bald eagle."<sup>107</sup>

Although the *Federal Register* notices cite a remarkably long list of federal statutes that continue to apply to the species after delisting,<sup>108</sup> there are two unacknowledged but significant issues. First, the most powerful and specifically applicable of the statutes -- the MBTA (enacted in 1918) and the Bald and Golden Eagle Protection Act (BGEPA) (enacted in 1940)<sup>109</sup> -- were in place before the listing of the bald eagle under the ESA and thus demonstrably had failed to prevent the species' slide toward extinction. Given that track record, the agency's renewed faith in the statutes prompts at least some concern. Second, none of the statutes in the agency's lengthy list provides unambiguous authority to protect habitat. Since habitat loss is the most serious threat facing the species, the lack of legal authority to protect habitat is a significant impediment to delisting the species as recovered despite its demographic recovery.

To overcome this difficulty, the USFWS adopted a new, narrowly focused

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<sup>106</sup> Reopening Comment on Eagle Delisting, *supra* note 103, at 8246 (emphasis added). The reach of "foreseeable future" was remained unspecified.

<sup>107</sup> *Id.* at 8249; *see also* Proposed Eagle Delisting, *supra* note 94, at 36,458.

<sup>108</sup> *See generally* Proposed Eagle Delisting, *supra* note 94, at 36,459; Eagle Delisting, *supra* note 92, at 8247-48. The list includes: the BGEPA, which prohibits take, possession, and commercial activities, 16 U.S.C. §§ 668-668d; the MBTA, which also prohibits take, possession, and commercial activities, 16 U.S.C. §§ 703-711; the Lacey Act, which criminalizes interstate shipment of illegally acquired birds and (more commonly) bird parts, 16 U.S.C. § 3372, and 18 U.S.C. §§ 42-44; CITES, note 56 *supra*; FIFRA, note 62 *supra*; and the Fish and Wildlife Coordination Act, which requires consideration of wildlife in water resource development projects, 16 U.S.C. §§ 661-661c.

<sup>109</sup> Act of June 8, 1940, ch. 278, 54 Stat. 250 (codified as amended at 16 U.S.C. §§ 668-668d).



regulatory program.<sup>110</sup> Under the BGEPA, it is illegal to "take, possess, ... at any time or in any manner" a bald or golden eagle.<sup>111</sup> The Act subsequently defines the term "take" to "include[] ... pursue, shoot, shoot at, poison, wound, kill, capture, trap, collect, or molest or disturb."<sup>112</sup> The inclusion of the term "disturb" substantially broadens the concept,<sup>113</sup> arguably to include habitat-affecting activities.<sup>114</sup> In preparing to delist the species, the USFWS promulgated a regulation defining "disturb" as

to agitate or bother a bald or golden eagle to the degree that causes, or is likely to cause, based on the best scientific evidence available, (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior.<sup>115</sup>

The preamble to the *Federal Register* notice emphasized that the phrase "is likely to cause" was included so that actual injury, death, or nest abandonment did not have to

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<sup>110</sup> Protection of Eagles; Definition of "Disturb," 72 Fed. Reg. 31,132 (2007); U.S. Fish & Wildlife Service, National Bald Eagle Management Guidelines (May 2007) <<http://www.fws.gov/migratorybirds/issues/BaldEagle/NationalBaldEagleManagementGuidelines.pdf>> (visited Aug. 18, 2007) [hereinafter cited as Eagle Management Guidelines].

<sup>111</sup> 16 U.S.C. § 668.

<sup>112</sup> *Id.* § 668c.

<sup>113</sup> The expansiveness of "disturb" is tempered by the culpability standard, which requires the actor to act "knowingly, or with wanton disregard for the consequences of his act." *Id.* § 668.

<sup>114</sup> Inclusion of the term "disturb" also distinguishes the BGEPA from the MBTA. The courts have resisted extending the MBTA's prohibitions to habitat modification such as logging. *See, e.g.,* Newton County Wildlife Ass'n v. United States Forest Service, 113 F.3d 110 (8th Cir. 1997); Sierra Club v. Martin, 110 F.3d 1551 (11th Cir. 1997); Seattle Audubon Soc'y v. Evans, 952 F.2d 297 (9th Cir. 1991); Mahler v. United States Forest Service, 927 F. Supp. 1559 (S.D. Ind. 1996).

<sup>115</sup> *Id.* at 31,140 (to be codified at 50 C.F.R. § 22.3). In its discussion of the regulation, the agency noted that the only court that had considered the relationship between the ESA and BGEPA had concluded that "[t]he plain meaning of the term 'disturb' is at least as broad as the term 'harm' and both terms are broad enough to include adverse habitat modification." *Id.* at 31,133 (quoting Contoski v. Scarlett, 2006 WL 2331180, at \*3 (D. Minn. Aug. 10, 2006). *Cf.* 50 C.F.R. § 17.3 ("Harm in the definition of 'take' in the [Endangered Species] Act means an act which actually kills or injures wildlife. Such act may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering."); *see also* Babbitt v. Sweet Home Chapter, 515 U.S. 687 (1995) (upholding the regulatory definition of "harm" with potentially significant limitations).

be documented "since death or injury will almost always occur at a later date and sometimes a different location."<sup>116</sup> The agency also noted that "injury" need not include wounding of killing an eagle but extended to a "decrease in its productivity."<sup>117</sup>

Simultaneously with promulgating the regulatory definition of "disturb," the agency issued *National Bald Eagle Management Guidelines*<sup>118</sup> that are intended to "[a]dvice landowners, land managers, and the general public of the potential for various human activities to disturb bald eagles."<sup>119</sup> The Guidelines state,

[i]n addition to immediate impacts, th[e new regulatory] definition also covers impacts that result from human-induced alterations initiated around a previously used nest site during the time when eagles are not present, if, upon the eagle's return, such alterations agitate or bother an eagle to a degree that injures an eagle or substantially interferes with normal breeding, feeding, or sheltering habits, and causes, or is likely to cause, a loss of productivity or nest abandonment.<sup>120</sup>

The new, formal definition of "disturb" and the *Guidelines* are an attempt to overcome the Tragedy of Fragmentation and to manage the threats to habitat for a species with a continent-wide range. The agency's position is that tying the habitat protection provisions of the proposed definition of "disturb" through the *Guidelines* to

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<sup>116</sup> Eagle Delisting, *supra* note 92, at 31,132.

<sup>117</sup> *Id.* at 31,133.

<sup>118</sup> Eagle Management Guidelines, note 110 *supra*.

<sup>119</sup> *Id.* at 1. One of the ironies of the ESA in contrast to BGEPA is that the latter is a much less flexible statute since it does not contain incidental take provisions. As the agency stated, "Although it is not possible under BGEPA or the MBTA to absolve from liability individuals or entities who follow the Guidelines, the Service will prioritize its enforcement efforts to focus on those individual or entities who take bald eagles or their parts, eggs, or nests without undertaking the measures recommended by the Guidelines." *Id.*

<sup>120</sup> *Id.* at 2. The *Guidelines* also note that activities that impact migrating and winter roost sites fall within the definition of "disturb" because such activities may interfere with feeding. *Id.* at 8. The protection for such sites is less, however, because the interference must cause injury or death because, although the proposed definition includes "nest abandonment" as a prohibited result, it does not include roost abandonment.

existing and alternate nest sites<sup>121</sup> overcomes the difficulties both in defining the specific habitat to be protected and in specifying how that habitat should be managed. The agency argues that this approach provides reasonable assurance of the necessary risk management. If it is successful in protecting sufficient individual nest and roosting sites, it will be because of the ESA: by protecting individual nest and roosting sites, the Act identified these sites so that they will continue to receive protection into the future. Unfortunately, however, local pressure to develop is insistent and the national perspective is easily distracted by newer goals.

#### **iv. Gray Wolf**

The attempts to delist the gray wolf in the northern Rocky Mountains emphasize the importance of risk management to recovery. Wolves were initially listed in 1967 when the subspecies *Canis lupus lycaon* ("timber wolf") was determined to be endangered in Minnesota and Michigan.<sup>122</sup> Over the next nine years, the USFWS listed three additional subspecies, the "Northern Rocky Mountain wolf" (*Canis lupus irremotus*),<sup>123</sup> the "Mexican wolf" (*Canis lupus baileyi*),<sup>124</sup> and the "gray wolf" (*Canis lupus monstrabilis*).<sup>125</sup> In 1978, the agency concluded that "the taxonomy of wolves is out of date" and abandoned the subspecific designations; the agency listed the entire

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<sup>121</sup> *Id.* at 7-8, 11.

<sup>122</sup> Native Fish and Wildlife; Endangered Species, 32 Fed. Reg. 4001, 4001 (1967).

<sup>123</sup> Conservation of Endangered Species and Other Fish or Wildlife; Amendments to Lists of Endangered Fish and Wildlife, 38 Fed. Reg. 14,678 (1973). Both subspecies were included on the list of endangered native wildlife when it was re-promulgated as part of a general restructuring of volume 50 of the *Code of Federal Regulations* in January 1974. See Subchapter B -- Taking, Possession, Transportation, Sale, Purchase, Barter, Exportation, and Importation of Wildlife, 39 Fed. Reg. 1158, 1175 (1974). The timber wolf had been redesignated the "Eastern Timber wolf."

<sup>124</sup> Endangered and Threatened Wildlife and Plants; Determination That Two Species of Butterflies Are Threatened Species and Two Species of Mammals Are Endangered Species, 41 Fed. Reg. 17,736 (1976).

<sup>125</sup> Endangered and Threatened Wildlife and Plants; Endangered Status for 159 Taxa of Animals, 41 Fed. Reg. 24,062 (1976).

species -- now denominated simply "gray wolf" (*Canis lupus*) -- as endangered throughout its range in the conterminous United States and Mexico except in Minnesota and Isle Royal National Park, Michigan, where it was listed as threatened.<sup>126</sup>

Although there may have been occasional dispersing individuals into the Northern Rocky Mountains, there were no established populations of wolves when *Canis lupus irremotus* was listed as endangered in 1973. In 1982, a wolf pack from Canada began to occupy Glacier National Park along the border. In 1986, the first litter of pups in over fifty years was discovered in the Park near the Canadian border. The same year a pack also denned east of the Park on the Blackfoot Indian Reservation.<sup>127</sup>

A recovery plan that had been prepared in 1980 was revised in 1987 since wolves were now breeding in the region.<sup>128</sup> The 1987 plan established a recovery goal that required three populations, one in northwestern Montana, one in central Idaho, and one in Yellowstone National Park.<sup>129</sup> Concluding that wolves were unlikely to recolonize Yellowstone National Park by themselves, the recovery planners proposed to reintroduce the species as an experimental population of the species. Following a lengthy and contentious process, the USFWS designated portions of Idaho, Montana, and Wyoming as two nonessential experimental populations in 1994.<sup>130</sup> In 1995 and 1996, as total of 66 wolves were released into the two areas, 35 in central Idaho and 31

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<sup>126</sup> Endangered and Threatened Wildlife and Plants; Reclassification of the Gray Wolf in the United States and Mexico, with Determination of Critical Habitat in Michigan and Minnesota, 43 Fed. Reg. 9607 (1978).

<sup>127</sup> NRM Wolf Proposed Delisting, *supra* note 23, at 6635.

<sup>128</sup> *Id.*

<sup>129</sup> *Id.* See also U.S. Fish & Wildlife Service & Northern Rocky Mountain Wolf Recovery Team, *Northern Rocky Mountain Wolf Recovery Plan* 13-14 (Aug. 3, 1987) (available at <[http://ecos.fws.gov/docs/recovery\\_plans/1987/870803.pdf](http://ecos.fws.gov/docs/recovery_plans/1987/870803.pdf)>).

<sup>130</sup> Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of Gray Wolves in Yellowstone National Park in Wyoming, Idaho, and Montana, 59 Fed. Reg. 60,252 (1994); Endangered and Threatened Wildlife and Plants; Establishment of a Nonessential Experimental Population of Gray Wolves in Central Idaho and Southwestern Montana, 59 Fed. Reg. 60,266 (1994). See *generally* Goble, note 9 *supra*.

in Yellowstone.<sup>131</sup> The species achieved the numerical and distributional goals specified in the species' recovery plan in 2000; the durational component was satisfied in 2002.<sup>132</sup>

Beginning in July 2000, the USFWS began a concerted push to delist wolves. After several false starts,<sup>133</sup> the agency delisted the Western Great Lakes (WGL) DPS in February 2007.<sup>134</sup> It has not, however, been successful thus far in delisting the Northern Rocky Mountain (NRM) DPS despite the fact that the species achieved the demographic goals for delisting. On February 8, 2006, the USFWS issued an advanced notice of proposed rulemaking to designate a NRM DPS and to delist the DPS.<sup>135</sup> In August of that year, however, the agency issued a notice finding that delisting of the DPS was not warranted. As the agency noted,

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<sup>131</sup> Endangered and Threatened Wildlife and Plants; Regulation for Nonessential Experimental Population Segment of the Western Distinct Population Segment of the Gray Wolf; Final Rule, 70 Fed. Reg. 1286, 1287 (2005).

<sup>132</sup> NRM Wolf Proposed Delisting, *supra* note 23, at 6635-37.

<sup>133</sup> The agency initially proposed to establish four DPS covering all populations of the species within the conterminous United States. Endangered and Threatened Wildlife and Plants; Proposal to Reclassify and Remove the Gray Wolf From the List of Endangered and Threatened Wildlife in Portions of the Conterminous United States; Proposal to Establish Three Special Regulations for Threatened Gray Wolves, 65 Fed. Reg. 43,450 (2000). Three of the four DPS (Western Great Lakes, Western, and Northeastern) were to be reclassified from endangered to threatened -- except where parts of the DPS were listed as experimental populations; the fourth DPS (the Mexican wolf) was to remain listed as endangered. In the area outside the DPS, the species would be delisted. *Id.* With the change in administrations, the USFWS on April 1, 2003, reclassified and delisted the species across the conterminous United States. Endangered and Threatened Wildlife and Plants; Final Rule to Reclassify and Remove the Gray Wolf from the List of Endangered and Threatened Wildlife in Portions of the Conterminous United States; Establishment of Two Special Regulations for Threatened Gray Wolves, 68 Fed. Reg. 15,804 (2003). This proposal replaced the four previously proposed DPS with three -- Eastern, Western, and Southwestern -- reduced the geographic scope of each DPS because "a DPS cannot be designated for an area that is unoccupied by a populations of the species of concern." *Id.* at 15,807. The species was to be delisted outside the three new DPS. Also on April 1, the USFWS published an Advance Notice of Proposed Rulemaking to delist the Eastern DPS. Endangered and Threatened Wildlife and Plants; Removing the Eastern Distinct Population Segment of Gray Wolf from the List of Endangered and Threatened Wildlife, 68 Fed. Reg. 15,876 (2003). Federal district courts in Oregon and Vermont held the agency's action to be arbitrary, capricious, and a violation of the ESA. *National Wildlife Federation v. Norton*, 386 F. Supp. 2d 553 (D. Vt. 2005); *Defenders of Wildlife v. Norton*, 354 F. Supp. 2d 1156 (D. Or. 2005). The proposals and the resulting litigation are discussed in Goble, note 46 *supra*.

<sup>134</sup> Endangered and Threatened Wildlife and Plants; Final Rule Designating the Western Great Lakes Populations of Gray Wolves as a Distinct Population Segment; Removing the Western Great Lakes Distinct Population Segment of the Gray Wolf from the Federal List of Endangered and Threatened Wildlife, 72 Fed. Reg. 6052 (2007).

<sup>135</sup> NRM Wolf Proposed Delisting, *supra* note 23, at 6634.

Because the primary threat to the wolf population (human predation and other take) still has the potential to significantly impact wolf populations if not adequately managed, the Service needs regulatory assurances that the States will manage for sustainable mortality levels before we can remove ESA protections."<sup>136</sup>

The USFWS concluded that it lacked the necessary assurances because "Wyoming State law and its wolf management plan do not provide the necessary regulatory mechanisms to assure that Wyoming's numerical and distributional share of a recovered NRM wolf population would be conserved if the protections of the ESA were removed."<sup>137</sup>

Like the bald eagle, the NRM wolf DPS demonstrates the crucial role that the risk-management structure plays in delisting species as recovered. Unlike the eagle, however, there is no federal statute that can provide the protection against the threat facing the species. The state wolf management plans thus are essential to maintaining the biologically recovered populations.

### **3. Recovery: A Preliminary Assessment**

The decisions to delist species as recovered provide some substance to the

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<sup>136</sup> Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to Establish the Northern Rocky Mountain Gray Wolf Population (*Canis lupus*) as a Distinct Population Segment To Remove the Northern Rocky Mountain Distinct Population Segment from the Federal List of Endangered and Threatened Wildlife, 71 Fed. Reg. 43,410, 43,426 (2006) [hereinafter cited as 12-Month Finding on Wolf]. See *generally id.* at 43,423-24. In January 2004, the USFWS determined that Wyoming's wolf management plan was inadequate. Wyoming's challenge to this decision was dismissed on procedural grounds by the district court, a decision that was affirmed by the Tenth Circuit Court of Appeals. *Wyoming v. United States Department of the Interior*, 360 F. Supp. 2d 1214 (D. Wyo. 2005), *aff'd per curiam*, 442 F.3d 1262 (10th Cir. 2006).

<sup>137</sup> 12-Month Finding on Wolf, *supra* note 136, at 43,430. The USFWS published a second proposed rule to delist the NRM DPS in February 2007. Endangered and Threatened Wildlife and Plants; Designating the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and Removing This Distinct Population Segment From the Federal List of Endangered and Threatened Wildlife, 72 Fed. Reg. 6106 (2007). The agency proposed to delist the species in Idaho and Montana and offered to delist the species in Wyoming if that state "adopts a State management plan that is consistent with the requirements ... that have already been incorporated into Montana's and Idaho's regulatory framework." *Id.* at 6134.

otherwise elusive concept of recovery. Although the decisions do not provide much in the way of specifics for either the probability or time elements of the risk of extinction decision, they do demonstrate that recovery has two components: a demographic component (the species's population size and dispersal are sufficient to provide reasonable assurances that it will not be extinguished by stochastic events) and a risk-management component (existing risk-management mechanisms provide reasonable assurances that the species will not be again placed at risk by removing the ESA's protection).

#### **A. The Demographic Component of Recovery**

The fewer the number of individuals and populations, and the more restricted the species's range, the greater the risk of extinction from a stochastic event in any given period of time. If the entire population of a species is located on a single atoll, one catastrophic event (such as a tsunami) might extinguish it.<sup>138</sup> The number of Puerto Rican parrots in the wild, for example, fell from 47 to 22 after hurricane Hugo devastated the Luquillo Experimental Forest.<sup>139</sup> Satisfying the demographic component of recovery therefore requires that there be a sufficient number of individuals and sufficiently dispersed population(s) to provide reasonable assurances that the species will not be extinguished by a foreseeable combination of stochastic events.<sup>140</sup>

The delisting packages have emphasized the number of both individuals and populations. The number of Robbins cinquefoil, for example, increased from less than 2,000 to more than 14,000 individuals and the number of populations increased from 1

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<sup>138</sup> See, e.g., Mark Shaffer, *Minimal Viable Populations: Coping with Uncertainty*, in *VIABLE POPULATIONS FOR CONSERVATION* 69, 70 (Michael E. Soule ed., 1987).

<sup>139</sup> See Puerto Rican Parrot (*Amazona vittata*), <http://audubon2.org/watchlist/viewSpecies.jsp?id=168> (visited on Nov. 5, 2007).

<sup>140</sup> Shaffer, *supra* note 16, at 131.

to 4.<sup>141</sup> Similarly, the number of Aleutian Canada goose increased nearly fifty-fold (from 790 individuals in 1975 to 36,978) and the breeding range increased from one to more than six islands.<sup>142</sup> The USFWS's decisionmaking, however, has become increasingly conclusory. For example, in responding to comments suggesting that the Douglas County DPS of the Columbia white-tailed deer should not be delisted until at least one additional population had been established, the agency noted that, although translocation "is likely to be an important component of the management of the ... DPS after delisting,"<sup>143</sup> it was not necessary before delisting because "[a] review of the threats" facing the DPS "shows that it no longer requires protection of the Act."<sup>144</sup>

Decisions reclassifying species from endangered to threatened also focus on the increasing numbers of individuals and populations. The Virginia round-leaf birch offers an example. In 1975, a single population of 41 individuals of was rediscovered after being thought extinct. The species was listed as endangered in April 1978<sup>145</sup> and reclassified as threatened in November 1994.<sup>146</sup> In its rationale for reclassifying the species, the USFWS noted that a breeding orchard had been established at the Reynolds Homestead Research Center and specimens from a program established at the U.S. National Arboretum had been widely distributed to arboreta, botanical gardens, nurseries, and private individuals.<sup>147</sup> In addition, 20 wild populations had been established and sufficient information about the species' life history and biological

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<sup>141</sup> Cinquefoil Delisting, *supra* note 70, at 54,973.

<sup>142</sup> Aleutian Canada Goose Delisting, *supra* note 49, at 15,645.

<sup>143</sup> Deer Delisting, *supra* note 76, at 43,652.

<sup>144</sup> *Id.* at 43,653.

<sup>145</sup> Endangered and Threatened Wildlife and Plants: Determination that 11 Plant Taxa Are Endangered Species and 2 Plant Taxa Are Threatened Species, 43 Fed. Reg. 17,910, 17,914 (1978).

<sup>146</sup> Endangered and Threatened Wildlife and Plants; Reclassification of the Virginia Round-Leaf Birch (*Betula uber*) from Endangered to Threatened, 59 Fed. Reg. 59,173 (1994).

<sup>147</sup> *Id.* at 59,174-75.



needs had been determined so that management to facilitate the species' reproduction was ongoing.<sup>148</sup> Finally, populations had been established on USFS land where the "habitats are protected from adverse modification."<sup>149</sup> The agency thus concluded that, although the species remained vulnerable due to its restricted range and relatively limited numbers, "the successful propagation and distribution of plants together with its current distribution and afforded protection" meant that the birch was not in imminent danger of extinction and thus was no longer endangered.<sup>150</sup>

## **B. The Risk-Management Component of Recovery**

Recovery also requires reasonable assurances that the risks the species faces are sufficiently addressed through some form of ongoing risk management so that the species will not slip back into an at-risk status. There must be sufficient risk management addressing both the recurrence of the threat factors that prompted the listing and of any new risks that have emerged.

As the case studies demonstrate, crafting a species-specific risk-management structure is likely to be the most difficult and uncertain problem in recovering most species. This reflects two factors. First, most species are at risk because of threats that cannot be eliminated. The majority of species are threatened by habitat modification and nonnative competitors or predators.<sup>151</sup> One study, for example, found that 60% of the listed species in the United States are imperiled by either disruption of natural fire

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<sup>148</sup> *Id.* at 59,174.

<sup>149</sup> *Id.* at 59,175.

<sup>150</sup> *Id.* at 59,176. The same concerns can be seen in decisions downlisting the Missouri bladderpod, Endangered and Threatened Wildlife and Plants; Reclassification of *Lesquerella filiformis* (Missouri Bladderpod) from Endangered to Threatened, 68 Fed. Reg. 59,337, 59,340 (2003); and the Louisiana pearlshell, Endangered and Threatened Wildlife and Plants; Determination to Reclassify the Louisiana Pearlshell (*Margaritifera hembeli*) from Endangered to Threatened, 58 Fed. Reg. 49,935 (1993).

<sup>151</sup> Wilcove et al., *Leading Threats*, *supra* note 12, at 95; Wilcove et al., *Quantifying Threats*, note 12 *supra*. These threats are frequently synergistic because nonnative species often thrive in disturbed habitats.

disturbance regimes or the spread of non-native species.<sup>152</sup> Such threats require ongoing conservation *management*.

For example, Kirtland's warbler requires controlled burning and selective logging to maintain the jack pine stand structure the species requires for nesting because a natural fire regime can no longer occur in the scattered jackpine stands of the Midwest.<sup>153</sup> Similarly, least Bell's vireo needs ongoing trapping of parasitic cowbirds to fledge offspring.<sup>154</sup> These and similar species face threats that require continuing management. Recovering such species becomes a question of securing both the necessary habitat and ongoing, biologically appropriate management of that habitat. These problems are likely to be dramatically exacerbated by global climate change.

The second factor making risk-management the more difficult problem for recovering listed species is the lack of sufficiently focused regulatory mechanisms to manage the threats. As the case studies demonstrate, for most listed species there is no specifically targeted legal protection other than the ESA.<sup>155</sup> As a result, conserving such species requires the creation of species-specific risk-management protocols.

Given the variety threats facing listed species, the types of regulatory mechanisms relied upon to provide the requisite conservation management has varied.

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<sup>152</sup> Wilcove & Chen, note 12 *supra*.

<sup>153</sup> Kirtland's warbler (*Dendroica kirtlandii*) requires prescribed burns to maintain appropriate jack-pine habitat structure. The warbler has exacting habitat requirements: extensive, homogenous stands of young jack pines located on poor soils -- a habitat type that was more common when forest fires were more common. Fire suppression and habitat fragmentation reduced this habitat and led to the listing of the species. Conserving the species requires regular burning of habitat to produce the requisite stand structure. See U.S. FISH & WILDLIFE SERVICE, KIRTLAND'S WARBLER RECOVERY PLAN App. B (1985).

<sup>154</sup> The brown-headed cowbird has an unusual reproductive strategy: they lay their eggs in the nests of other species, leaving the host to raise the cowbird young. Cowbirds have evolved to have a quick hatch time and to develop rapidly which allows them to out-compete their fellow nestlings with the result that the host's own young seldom survive. Least Bell's vireo is particularly susceptible to such brood parasitism and controlling cowbirds is a significant recovery goal for the species. U.S. FISH & WILDLIFE SERVICE, DRAFT RECOVERY PLAN FOR THE LEAST BELL'S VIREO (*VIREO BELLII PUSILLUS*) 25-28 (1998).

<sup>155</sup> Doremus, note 40 *supra*; Williams et al., note 40 *supra*. This is particularly true for plants and invertebrates which are often entirely without legal protection.

For some species (such as the Aleutian cackling goose), this component involved eliminating a discrete threat (foxes on islands) and establishing a management structure to monitor take. Other species (such as Columbian white-tailed deer, bald eagle, and gray wolf) require a specifically tailored risk-management structure because there was no existing regulatory mechanisms that is sufficiently focused to provide the more intensive ongoing conservation management needed to address the threats facing the species. Although the goose, the deer, the cinquefoil, the eagle, and the wolf are points along a continuum, the distinction between them is significant because the particularized risk-management structure required by the deer, eagle, and wolf means that there is unlikely to be any existing management structure such as the flyway councils established under the MBTA that will provide the authority needed to manage the risks the species face.

This is the irony of the ESA: it is a powerful statute that can bring species back from the brink of extinction, but the strength of the Act in preventing extinction becomes a deterrent to delisting a species because to do so will frequently remove the protection needed to conserve it -- and thus lead to a downward spiral that would necessitate relisting.